

**SEDAMYL UK Ltd DENISON ROAD, SELBY, NORTH YORKSHIRE**

BEST AVAILABLE TECHNIQUES COMPLIANCE STATEMENT V4

NOVEMBER 2022

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# Introduction

## Scope

This document has been written to demonstrate that following a recent review of the processing at the Selby Wheat Processing Facility, Denison Road, North Yorkshire YO8 8AN, operated by Sedamyl UK Limited, under Environment Agency Permit reference EPR/KP3030TZ is currently being operated in compliance with the following Best Available Techniques (BAT) reference documents (BRef) in accordance with the Industrial Emissions directive European directives:

* + - Primary BRef: The Best Available Technique conclusions for the production of Large Volume Organic Chemicals (published 07/12/2017).
    - Horizontal BRef: The Best Available Techniques conclusion for Common Waste Water and Waste Gas Treatment / management systems in the Chemical Sector (published 09/06/2016).
    - Combustion plant: The Best Available Techniques conclusion for Large Combustion Plants (published 17/08/2017).

## Amendment

Further to this, in 2020/21 Sedamyl submitted Variations to EPR/KP3030TZ which included changes to processes which fall under the additional BRefs found below:

* + - Best Available Techniques conclusions for the Food, Drink And Milk Industries (published 12/11/19)
    - Best Available Techniques to Industrial Cooling Systems (published Dec 2001)

## Variation 10

Please note that this BAT Assessment has been produced to demonstrate compliance for the permitted facility as a whole. The current iteration V3 has been updated to include any additional information relevant to the proposed changes under the Variation 10 application. These changes have been highlighted in Yellow throughout.

Please also see SED C3-3a-2 Technical Description V010 for detailed descriptions of each addition to plant, processes and equipment.

# Production of Large Volume Organic Chemicals

## General BAT Conclusions

### Monitoring of Emissions to Air

#### BAT1

BAT is to monitor channelled emissions to air from process furnaces/heaters in accordance with EN standards and with at least the minimum frequency given in the table below. If EN standards are not available, BAT is to use ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality.

**NOT APPLICABLE because no process furnaces/heaters are installed on site.**

#### BAT2

BAT is to monitor channelled emissions to air other than from process furnaces/heaters in accordance with EN standards and with at least the minimum frequency given in the table below. If EN standards are not available, BAT is to use ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality.

**APPLICABLE. Sedamyl UK carries out periodical air emission control surveys within the frequency requested by its Environmental Permit according to the BS EN 14792 for Oxides of Nitrogen, BS EN 13284-1 for particulate, BS EN 12619 for VOC for all the stacks listed.**

## Emissions to Air

### Emissions to air from process furnaces/heaters

#### BAT3

In order to reduce emissions to air of CO and unburnt substances from process furnaces/heaters, BAT is to ensure an optimised combustion. Optimised combustion is achieved by good design and operation of the equipment which includes optimisation of the temperature and residence time in the combustion zone, efficient mixing of the fuel and combustion air, and combustion control. Combustion control is based on the continuous monitoring and automated control of appropriate combustion parameters (e.g. O2, CO, fuel to air ratio, and unburnt substances).

**NOT APPLICABLE because no process furnaces/heaters are installed on site.**

#### BAT4

In order to reduce NOX emissions to air from process furnaces/heaters, BAT is to use one or a combination of the techniques given below.

**NOT APPLICABLE because no process furnaces/heaters are installed on site.**

#### BAT5

In order to prevent or reduce dust emissions to air from process furnaces/heaters, BAT is to use one or a combination of the techniques given below.

**NOT APPLICABLE because no process furnaces/heaters are installed on site.**

#### BAT6

In order to prevent or reduce SO2 emissions to air from process furnaces/heaters, BAT is to use one or both of the techniques given below.

**NOT APPLICABLE because no process furnaces/heaters are installed on site.**

### Emissions to air from the use of SCR or SNCR

#### BAT7

In order to reduce emissions to air of ammonia which is used in selective catalytic reduction (SCR) or selective non-catalytic reduction (SNCR) for the abatement of NOX emissions, BAT is to optimise the design and/or operation of SCR or SNCR (e.g. optimised reagent to NOX ratio, homogeneous reagent distribution and optimum size of the reagent drops). BAT-associated emission levels (BAT-AELs) for emissions from a lower olefins cracker furnace when SCR or SNCR is used: Table 2.1.

**NOT APPLICABLE because no selective catalytic reduction (SCR) or selective non-catalytic reduction (SNCR) for the abatement of NOX emissions are performed on site.**

### Emissions to air from other processes/sources

### Techniques to reduce emissions from other processes/sources

#### BAT8

In order to reduce the load of pollutants sent to the final waste gas treatment, and to increase resource efficiency, BAT is to use an appropriate combination of the techniques given below for process off-gas streams.

**APPLICABLE. The waste gases from fermentation tanks are processed by a wet scrubber (A21). The current set up of the scrubber is not representing BAT as the concentration of the flue gas is high compared to the 75 mg/m3 benchmark. Sedamyl Uk commits to improve the performances of the 2 column scrubbers to achieve the benchmark value within compliance date.**

**The action plan foresees various possible steps:**

**- fine tuning of the existent system and research of a new process balance to optimize efficiency and sustainability of the system itself, in regards of the water used and recovered into the process.**

**-If the previous step doesn’t bring enough results, evaluation of a chiller system to cool down the temperature of the water used for the abatement.**

**-if previous steps don’t bring enough results, evaluation of other VOC abatement techniques (biofilter, RTO).**

#### BAT9

In order to reduce the load of pollutants sent to the final waste gas treatment, and to increase energy efficiency, BAT is to send process off-gas streams with a sufficient calorific value to a combustion unit. BAT 8a and 8b have priority over sending process off-gas streams to a combustion unit.

Applicability: Sending process off-gas streams to a combustion unit may be restricted due to the presence of contaminants or due to safety considerations.

**NOT APPLICABLE. Off biogas from waste water treatment plant has insufficient calorific value and is too low in quantity to sustain a combustion unit (1000 Smc/day). If production of biogas from waste water treatment plant will increase the evaluation of a small combustion unit will be undertaken.**

#### BAT10

In order to reduce channelled emissions of organic compounds to air, BAT is to use one or a combination of the techniques given below.

**APPLICABLE. COMPLIANT.**

|  |  |
| --- | --- |
| **Technique** | **Applied?** |
| Condensation | NO |
| Adsorption | NO |
| Wet scrubbing | YES – Abated on Main VOC Outlet, (see BAT8) |
| Catalytic oxidiser | NO |
| Thermal oxidiser | NO |

#### BAT11

In order to reduce channelled dust emissions to air, BAT is to use one or a combination of the techniques given below.

**APPLICABLE. COMPLIANT.**

**Applied?**

**Technique**

|  |  |
| --- | --- |
| Cyclone | NO |
| Electrostatic precipitator | NO |
| Fabric filter | On all outlets on all powders |
| Two-stage dust filter | NO |
| Ceramic/metal filter | NO |
| Wet dust scrubbing | NO |

#### BAT12

In order to reduce emissions to air of sulphur dioxide and other acid gases (e.g. HCl), BAT is to use wet scrubbing.

**NOT APPLICABLE: Negligible concentrations of acid compounds present in emission in the small Biogas stream.**

### Techniques to reduce emissions from a thermal oxidiser

#### BAT13

In order to reduce emissions to air of NOX, CO, and SO2 from a thermal oxidiser, BAT is to use an appropriate combination of the techniques given below.

**NOT APPLICABLE because no thermal oxidisers are installed on site.**

## Emissions to water

#### BAT14

In order to reduce the waste water volume, the pollutant loads discharged to a suitable final treatment (typically biological treatment), and emissions to water, BAT is to use an integrated waste water management and treatment strategy that includes an appropriate combination of process-integrated techniques, techniques to recover pollutants at source, and pretreatment techniques, based on the information provided by the inventory of waste water streams specified in the CWW BAT conclusions.

**APPLICABLE. COMPLIANT. Limiting product losses from cleaning, spillages etc. As these losses are treated within the waste water treatment plant (WWTP), the losses are benchmarked and targeted for action as kg COD/tonne wheat;**

**Optimising the amount of water used and recycled throughout the process, water usage and water recycled are benchmarked against industry standards and within the group. Dry cleaning procedures are used wherever possible with the wet and dry processes separated as part of the design. CIP activities and wet washing are limited to the wet mill and the distillery area with all waste liquid streams physically collected, equalised and fed to the WWTP. It is considered that the segregated design of the installation minimises the amount of water required for cleaning purposes.**

## Resource Efficiency

#### BAT15

In order to increase resource efficiency when using catalysts, BAT is to use a combination of the techniques given below.

**NOT APPLICABLE because no catalysts are used on site.**

#### BAT16

In order to increase resource efficiency, BAT is to recover and reuse organic solvents.

**NOT APPLICABLE because no organic solvents are used on site.**

## Residues

#### BAT17

In order to prevent or, where that is not practicable, to reduce the amount of waste being sent for disposal, BAT is to use an appropriate combination of the techniques given below.

**APPLICABLE**

|  |  |
| --- | --- |
| **Technique** | **Applied?** |
| ***Techniques to prevent or reduce the generation of waste*** | |
| Addition of inhibitors to distillation systems | N/A |
| Minimisation of high- boiling residue formation in distillation systems | N/A |
| ***Techniques to recover materials for reuse or recycling*** | |
| Material recovery (e.g. by distillation, cracking) | Yes, By-products are recovered from distillation. |
| Catalyst and adsorbent regeneration | N/A |
| ***Techniques to recover energy*** | |
| Use of residues as a fuel | N/A |

## Other than normal operating conditions

#### BAT18

In order to prevent or reduce emissions from equipment malfunctions, BAT is to use all of the techniques given below.

|  |  |
| --- | --- |
| **Technique** | **Applied?** |
| Identification of critical equipment | Yes, plant has Critical Env. Devices, based on Environment management system ISO 14001  (2015) outputs. |
| Asset reliability programme for critical equipment | Yes, calibration and periodical maintenance. |
| Back-up systems for critical equipment | N/A because covered by Technique b, (asset reliability  programme for critical equipment). |

#### BAT19

In order to prevent or reduce emissions to air and water occurring during other than normal operating conditions, BAT is to implement measures commensurate with the relevance of potential pollutant releases for: (i) start-up and shutdown operations; (ii) other circumstances (e.g. regular and extraordinary maintenance work and cleaning operations of the units and/or of the waste gas treatment system) including those that could affect the proper functioning of the installation.

**APPLICABLE. COMPLIANT. The system is covered by regular maintenance schedule, readiness of spare parts for emergency situations and repair, ability for temporary storage of emissions.**

## BAT conclusions for lower olefins production

### Emissions to air

### BAT-AELs for emissions to air from a lower olefins cracker furnace

The associated monitoring is in BAT1

### Techniques to reduce emissions from decoking

#### BAT20

In order to reduce emissions to air of dust and CO from the decoking of the cracker tubes, BAT is to use an appropriate combination of the techniques to reduce the frequency of decoking given below and one or a combination of the abatement techniques given below.

**NOT APPLICABLE because no lower olefins cracker furnaces are installed on site.**

### Emissions to water

#### BAT21

In order to prevent or reduce the amount of organic compounds and waste water discharged to waste water treatment, BAT is to maximise the recovery of hydrocarbons from the quench water of the primary fractionation stage and reuse the quench water in the dilution steam generation system.

**NOT APPLICABLE because no lower olefins cracker furnaces are installed on site.**

#### BAT22

In order to reduce the organic load discharged to waste water treatment from the spent caustic scrubber liquor originating from the removal of H2S from the cracked gases, BAT is to use stripping.

**NOT APPLICABLE because no lower olefins cracker furnaces are installed on site.**

#### BAT23

In order to prevent or reduce the amount of sulphides discharged to waste water treatment from the spent caustic scrubber liquor originating from the removal of acid gases from the cracked gases, BAT is to use one or a combination of the techniques given below.

**NOT APPLICABLE because no lower olefins cracker furnaces are installed on site.**

## BAT conclusions for aromatics production

### Emissions to air

#### BAT24

In order to reduce the organic load from process off-gases sent to the final waste gas treatment and to increase resource efficiency, BAT is to recover organic materials by using BAT 8b. or, where that is not practicable, to recover energy from these process off-gases (see also BAT 9).

**NOT APPLICABLE because aromatics are not produced on site.**

#### BAT25

In order to reduce emissions to air of dust and organic compounds from the regeneration of hydrogenation catalyst, BAT is to send the process off-gas from catalyst regeneration to a suitable treatment system.

**NOT APPLICABLE because aromatics are not produced on site.**

### Emissions to water

#### BAT26

In order to reduce the amount of organic compounds and waste water discharged from aromatic extraction units to waste water treatment, BAT is either to use dry solvents or to use a closed system for the recovery and reuse of water when wet solvents are used.

**NOT APPLICABLE because aromatics are not produced on site.**

#### BAT27

In order to reduce the waste water volume and the organic load discharged to waste water treatment, BAT is to use an appropriate combination of the techniques given below.

**NOT APPLICABLE because aromatics are not produced on site.**

### Resource efficiency

#### BAT28

In order to use resources efficiently, BAT is to maximise the use of co-produced hydrogen, e.g. from dealkylation reactions, as a chemical reagent or fuel by using BAT 8a. or, where that is not practicable, to recover energy from these process vents (see BAT 9).

**NOT APPLICABLE because aromatics are not produced on site.**

### Energy efficiency

#### BAT29

In order to use energy efficiently when using distillation, BAT is to use one or a combination of the techniques given below.

**NOT APPLICABLE because aromatics are not produced on site.**

### Residues

#### BAT30

In order to prevent or reduce the amount of spent clay being sent for disposal, BAT is to use one or both of the techniques given below.

**NOT APPLICABLE because aromatics are not produced on site.**

## BAT conclusions for ethylbenzene and styrene monomer production

### Process selection

#### BAT31

In order to prevent or reduce emissions to air of organic compounds and acid gases, the generation of waste water and the amount of waste being sent for disposal from the alkylation of benzene with ethylene, BAT for new plants and major plant upgrades is to use the zeolite catalyst process.

**NOT APPLICABLE because ethylbenzene and styrene monomer are not produced on site.**

### Emissions to air

#### BAT32

In order to reduce the load of HCl sent to the final waste gas treatment from the alkylation unit in the AlCl3- catalysed ethylbenzene production process, BAT is to use caustic scrubbing. Only applicable to existing plants using the AlCl3 catalysed ethylbenzene production process.

**NOT APPLICABLE because ethylbenzene and styrene monomer are not produced on site.**

#### BAT33

In order to reduce the load of dust and HCl sent to the final waste gas treatment from catalyst replacement operations in the AlCl3-catalysed ethylbenzene production process, BAT is to use wet scrubbing and then use the spent scrubbing liquor as wash water in the post-alkylation reactor wash section.

**NOT APPLICABLE because ethylbenzene and styrene monomer are not produced on site.**

#### BAT34

In order to reduce the organic load sent to the final waste gas treatment from the oxidation unit in the SMPO production process, BAT is to use one or a combination of the techniques given below.

**NOT APPLICABLE because ethylbenzene and styrene monomer are not produced on site.**

#### BAT35

In order to reduce emissions of organic compounds to air from the acetophenone hydrogenation unit in the SMPO production process, during other than normal operating conditions (such as start-up events), BAT is to send the process off-gas to a suitable treatment system.

**NOT APPLICABLE because ethylbenzene and styrene monomer are not produced on site.**

### Emissions to water

#### BAT36

In order to reduce waste water generation from ethylbenzene dehydrogenation and to maximise the recovery of organic compounds, BAT is to use an appropriate combination of the techniques given below.

**NOT APPLICABLE because ethylbenzene and styrene monomer are not produced on site.**

#### BAT37

In order to reduce emissions to water of organic peroxides from the oxidation unit in the SMPO production process and to protect the downstream biological waste water treatment plant, BAT is to pretreat waste water containing organic peroxides using hydrolysis before it is combined with other waste water streams and discharged to the final biological treatment.

**NOT APPLICABLE because ethylbenzene and styrene monomer are not produced on site.**

### Resource efficiency

#### BAT38

In order to recover organic compounds from ethylbenzene dehydrogenation prior to the recovery of hydrogen (see BAT 39), BAT is to use one or both of the techniques given below.

**NOT APPLICABLE because ethylbenzene and styrene monomer are not produced on site.**

#### BAT39

In order to increase resource efficiency, BAT is to recover the co-produced hydrogen from ethylbenzene dehydrogenation, and to use it either as a chemical reagent or to combust the dehydrogenation off-gas as a fuel (e.g. in the steam superheater).

**NOT APPLICABLE because ethylbenzene and styrene monomer are not produced on site.**

#### BAT40

In order to increase the resource efficiency of the acetophenone hydrogenation unit in the SMPO production process, BAT is to minimise excess hydrogen or to recycle hydrogen by using BAT 8a. If BAT 8a is not applicable, BAT is to recover energy (see BAT 9).

**NOT APPLICABLE because ethylbenzene and styrene monomer are not produced on site.**

### Residues

#### BAT41

In order to reduce the amount of waste being sent for disposal from spent catalyst neutralisation in the AlCl3-catalysed ethylbenzene production process, BAT is to recover residual organic compounds by stripping and then concentrate the aqueous phase to give a usable AlCl3 by-product.

**NOT APPLICABLE because ethylbenzene and styrene monomer are not produced on site.**

#### BAT42

In order to prevent or reduce the amount of waste tar being sent for disposal from the distillation unit of ethylbenzene production, BAT is to use one or a combination of the techniques given below.

**NOT APPLICABLE because ethylbenzene and styrene monomer are not produced on site.**

#### BAT43

In order to reduce the generation of coke (which is both a catalyst poison and a waste) from units producing styrene by ethylbenzene dehydrogenation, BAT is to operate at the lowest possible pressure that is safe and practicable.

**NOT APPLICABLE because ethylbenzene and styrene monomer are not produced on site.**

#### BAT44

In order to reduce the amount of organic residues being sent for disposal from styrene monomer production including its co-production with propylene oxide, BAT is to use one or a combination of the techniques given below.

**NOT APPLICABLE because ethylbenzene and styrene monomer are not produced on site.**

## BAT conclusions for formaldehyde production

### Emissions to air

#### BAT45

In order to reduce emissions of organic compounds to air from formaldehyde production and to use energy efficiently, BAT is to use one of the techniques given below.

**NOT APPLICABLE because formaldehyde is not produced on site.**

### Emissions to water

#### BAT46

In order to prevent or reduce waste water generation (e.g. from cleaning, spills and condensates) and the organic load discharged to further waste water treatment, BAT is to use one or both of the techniques given below.

**NOT APPLICABLE because formaldehyde is not produced on site.**

### Residues

#### BAT47

In order to reduce the amount of paraformaldehyde-containing waste being sent for disposal, BAT is to use one or a combination of the techniques given below.

**NOT APPLICABLE because formaldehyde is not produced on site.**

## BAT conclusions for ethylene oxide and ethylene glycols production

### Process selection

#### BAT48

In order to reduce the consumption of ethylene and emissions to air of organic compounds and CO2, BAT for new plants and major plant upgrades is to use oxygen instead of air for the direct oxidation of ethylene to ethylene oxide.

**NOT APPLICABLE because ethylene oxide and ethylene glycols are not produced on site.**

### Emissions to air

#### BAT49

In order to recover ethylene and energy and to reduce emissions of organic compounds to air from the EO plant, BAT is to use both of the techniques given below.

**NOT APPLICABLE because ethylene oxide and ethylene glycols are not produced on site.**

#### BAT50

In order to reduce the consumption of ethylene and oxygen and to reduce CO2 emissions to air from the EO unit, BAT is to use a combination of the techniques in BAT 15 and to use inhibitors.

**NOT APPLICABLE because ethylene oxide and ethylene glycols are not produced on site.**

#### BAT51

In order to reduce emissions of organic compounds to air from the desorption of CO2 from the scrubbing medium used in the EO plant, BAT is to use a combination of the techniques given below.

**NOT APPLICABLE because ethylene oxide and ethylene glycols are not produced on site.**

#### BAT52

In order to reduce EO emissions to air, BAT is to use wet scrubbing for waste gas streams containing EO.

**NOT APPLICABLE because ethylene oxide and ethylene glycols are not produced on site.**

#### BAT53

In order to prevent or reduce emissions of organic compounds to air from cooling of the EO absorbent in the EO recovery unit, BAT is to use one of the techniques given below.

**NOT APPLICABLE because ethylene oxide and ethylene glycols are not produced on site.**

### Emissions to water

#### BAT54

In order to reduce the waste water volume and to reduce the organic load discharged from the product purification to final waste water treatment, BAT is to use one or both of the techniques given below.

**NOT APPLICABLE because ethylene oxide and ethylene glycols are not produced on site.**

### Residues

#### BAT55

In order to reduce the amount of organic waste being sent for disposal from the EO and EG plant, BAT is to use a combination of the techniques given below.

**NOT APPLICABLE because ethylene oxide and ethylene glycols are not produced on site.**

## BAT conclusions for phenol production

### Emissions to air

#### BAT56

In order to recover raw materials and to reduce the organic load sent from the cumene oxidation unit to the final waste gas treatment, BAT is to use a combination of the techniques given below.

**NOT APPLICABLE because phenol is not produced on site.**

#### BAT57

In order to reduce emissions of organic compounds to air, BAT is to use technique d given below for waste gas from the cumene oxidation unit. For any other individual or combined waste gas streams, BAT is to use one or a combination of the techniques given below.

**NOT APPLICABLE because phenol is not produced on site.**

### Emissions to water

#### BAT58

In order to reduce emissions to water of organic peroxides from the oxidation unit and, if necessary, to protect the downstream biological waste water treatment plant, BAT is to pretreat waste water containing organic peroxides using hydrolysis before it is combined with other waste water streams and discharged to the final biological treatment.

**NOT APPLICABLE because phenol is not produced on site.**

#### BAT59

In order to reduce the organic load discharged from the cleavage unit and the distillation unit to further waste water treatment, BAT is to recover phenol and other organic compounds (e.g. acetone) using extraction followed by stripping.

**NOT APPLICABLE because phenol is not produced on site.**

### Residues

#### BAT60

In order to prevent or reduce the amount of tar being sent for disposal from phenol purification, BAT is to use one or both of the techniques given below.

**NOT APPLICABLE because phenol is not produced on site.**

## BAT conclusions for ethanolamines production

### Emissions to air

#### BAT61

In order to reduce ammonia emissions to air and to reduce the consumption of ammonia from the aqueous ethanolamines production process, BAT is to use a multistage wet scrubbing system.

**NOT APPLICABLE because ethanolamines are not produced on site.**

### Emissions to water

#### BAT62

In order to prevent or reduce emissions of organic compounds to air and emissions to water of organic substances from the vacuum systems, BAT is to use one or a combination of the techniques given below.

**NOT APPLICABLE because ethanolamines are not produced on site.**

### Raw material consumption

#### BAT63

In order to use ethylene oxide efficiently, BAT is to use a combination of the techniques given below.

**NOT APPLICABLE because ethanolamines are not produced on site.**

## BAT conclusions for toluene diisocyanite (TDI) and methylene diphenyl diisocyanate (MDI) production

### Emissions to air

#### BAT64

In order to reduce the load of organic compounds, NOX, NOX precursors and SOX sent to the final waste gas treatment (see BAT 66) from DNT, TDA and MDA plants, BAT is to use a combination of the techniques given below.

**NOT APPLICABLE because toluene diisocyanate (TDI) and methylene diphenyl diisocyanate (MDI) are not produced on site.**

#### BAT65

In order to reduce the load of HCl and phosgene sent to the final waste gas treatment and to increase resource efficiency, BAT is to recover HCl and phosgene from the process off-gas streams of TDI and/or MDI plants by using an appropriate combination of the techniques given below.

**NOT APPLICABLE because toluene diisocyanate (TDI) and methylene diphenyl diisocyanate (MDI) are not produced on site.**

#### BAT66

In order to reduce emissions to air of organic compounds (including chlorinated hydrocarbons), HCl and chlorine, BAT is to treat combined waste gas streams using a thermal oxidiser followed by caustic scrubbing.

**NOT APPLICABLE because toluene diisocyanate (TDI) and methylene diphenyl diisocyanate (MDI) are not produced on site.**

#### BAT67

In order to reduce emissions to air of PCDD/F from a thermal oxidiser (see Section 12.1) treating process off-gas streams containing chlorine and/or chlorinated compounds, BAT is to use technique a, if necessary followed by technique b, given below.

**NOT APPLICABLE because toluene diisocyanate (TDI) and methylene diphenyl diisocyanate (MDI) are not produced on site.**

### Emissions to water

#### BAT68

BAT is to monitor emissions to water with at least the frequency given below and in accordance with EN standards. If EN standards are not available, BAT is to use ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality.

**NOT APPLICABLE because toluene diisocyanate (TDI) and methylene diphenyl diisocyanate (MDI) are not produced on site.**

#### BAT69

In order to reduce the load of nitrite, nitrate and organic compounds discharged from the DNT plant to waste water treatment, BAT is to recover raw materials, to reduce the waste water volume and to reuse water by using an appropriate combination of the techniques given below.

**NOT APPLICABLE because toluene diisocyanate (TDI) and methylene diphenyl diisocyanate (MDI) are not produced on site.**

#### BAT70

In order to reduce the load of poorly biodegradable organic compounds discharged from the DNT plant to further waste water treatment, BAT is to pretreat the waste water using one or both of the techniques given below.

**NOT APPLICABLE because toluene diisocyanate (TDI) and methylene diphenyl diisocyanate (MDI) are not produced on site.**

#### BAT71

In order to reduce waste water generation and the organic load discharged from the TDA plant to waste water treatment, BAT is to use a combination of techniques a., b. and c. and then to use technique d. as given below.

**NOT APPLICABLE because toluene diisocyanate (TDI) and methylene diphenyl diisocyanate (MDI) are not produced on site.**

#### BAT72

In order to prevent or reduce the organic load discharged from MDI and/or TDI plants to final waste water treatment, BAT is to recover solvents and reuse water by optimising the design and operation of the plant.

**NOT APPLICABLE because toluene diisocyanate (TDI) and methylene diphenyl diisocyanate (MDI) are not produced on site.**

#### BAT73

In order to reduce the organic load discharged from a MDA plant to further waste water treatment, BAT is to recover organic material using one or a combination of the techniques given below.

**NOT APPLICABLE because toluene diisocyanate (TDI) and methylene diphenyl diisocyanate (MDI) are not produced on site.**

### Residues

#### BAT74

In order to reduce the amount of organic residues being sent for disposal from the TDI plant, BAT is to use a combination of the techniques given below.

**NOT APPLICABLE because toluene diisocyanate (TDI) and methylene diphenyl diisocyanate (MDI) are not produced on site.**

## BAT conclusions for ethylene dichloride and vinyl chloride monomer production

### Emissions to air

### BAT-AEL for emissions to air from an EDC cracker furnace

The associated monitoring is in BAT1

### Techniques and BAT-AEL for emissions to air from other sources

#### BAT75

In order to reduce the organic load sent to the final waste gas treatment and to reduce raw material consumption, BAT is to use all of the techniques given below.

**NOT APPLICABLE because ethylene dichloride and vinyl chloride monomer are not produced on site.**

#### BAT76

In order to reduce emissions to air of organic compounds (including halogenated compounds), HCl and Cl2, BAT is to treat the combined waste gas streams from EDC and/or VCM production by using a thermal oxidiser followed by two-stage wet scrubbing.

**NOT APPLICABLE because ethylene dichloride and vinyl chloride monomer are not produced on site.**

#### BAT77

In order to reduce emissions to air of PCDD/F from a thermal oxidiser (see Section 12.1) treating process off-gas streams containing chlorine and/or chlorinated compounds, BAT is to use technique a, if necessary followed by technique b, given below.

**NOT APPLICABLE because ethylene dichloride and vinyl chloride monomer are not produced on site.**

#### BAT78

In order to reduce emissions to air of dust and CO from the decoking of the cracker tubes, BAT is to use one of the techniques to reduce the frequency of decoking given below and one or a combination of the abatement techniques given below.

**NOT APPLICABLE because ethylene dichloride and vinyl chloride monomer are not produced on site.**

### Emissions to water

#### BAT79

BAT is to monitor emissions to water with at least the frequency given below and in accordance with EN standards. If EN standards are not available, BAT is to use ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality.

**NOT APPLICABLE because ethylene dichloride and vinyl chloride monomer are not produced on site.**

#### BAT80

In order to reduce the load of chlorinated compounds discharged to further waste water treatment and to reduce emissions to air from the waste water collection and treatment system, BAT is to use hydrolysis and stripping as close as possible to the source.

**NOT APPLICABLE because ethylene dichloride and vinyl chloride monomer are not produced on site.**

#### BAT81

In order to reduce emissions to water of PCDD/F and copper from the oxychlorination process, BAT is to use technique a. or, alternatively, technique b together with an appropriate combination of techniques c.,

d. and e. given below.

**NOT APPLICABLE because ethylene dichloride and vinyl chloride monomer are not produced on site.**

### Energy efficiency

#### BAT82

In order to use energy efficiently, BAT is to use a boiling reactor for the direct chlorination of ethylene. Only applicable to new direct chlorination plants.

**NOT APPLICABLE because ethylene dichloride and vinyl chloride monomer are not produced on site.**

#### BAT83

In order to reduce the energy consumption of EDC cracker furnaces, BAT is to use promoters for the chemical conversion.

**NOT APPLICABLE because ethylene dichloride and vinyl chloride monomer are not produced on site.**

#### BAT84

In order to reduce the amount of coke being sent for disposal from VCM plants, BAT is to use a combination of the techniques given below.

**NOT APPLICABLE because ethylene dichloride and vinyl chloride monomer are not produced on site.**

#### BAT85

In order to reduce the amount of hazardous waste being sent for disposal and to increase resource efficiency, BAT is to use all of the techniques given below.

**NOT APPLICABLE because ethylene dichloride and vinyl chloride monomer are not produced on site.**

## BAT conclusions for hydrogen peroxide production

### Emissions to air

#### BAT86

In order to recover solvents and to reduce emissions of organic compounds to air from all units other than the hydrogenation unit, BAT is to use an appropriate combination of the techniques given below. In the

case of using air in the oxidation unit, this includes at least technique d. In the case of using pure oxygen in the oxidation unit, this includes at least technique b. using chilled water.

**NOT APPLICABLE because hydrogen peroxide is not produced on site.**

#### BAT87

In order to reduce emissions of organic compounds to air from the hydrogenation unit during start- up operations, BAT is to use condensation and/or adsorption.

**NOT APPLICABLE because hydrogen peroxide is not produced on site.**

#### BAT88

In order to prevent benzene emissions to air and water, BAT is not to use benzene in the working solution.

**NOT APPLICABLE because hydrogen peroxide is not produced on site.**

### Emissions to water

#### BAT89

In order to reduce the waste water volume and the organic load discharged to waste water treatment, BAT is to use both of the techniques given below.

**NOT APPLICABLE because hydrogen peroxide is not produced on site.**

#### BAT90

In order to prevent or reduce emissions to water of poorly bioeliminable organic compounds, BAT is to use one of the techniques given below.

**NOT APPLICABLE because hydrogen peroxide is not produced on site.**

# Large Combustion Plants

## General BAT conclusions

### Environmental management systems

#### BAT1

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

* + - 1. commitment of the management, including senior management;
      2. definition, by the management, of an environmental policy that includes the continuous improvement of the environmental performance of the installation;
      3. planning and establishing the necessary procedures, objectives and targets, in conjunction with financial planning and investment;
      4. implementation of procedures paying particular attention to:

1. structure and responsibility
2. recruitment, training, awareness and competence
3. communication
4. employee involvement
5. documentation
6. effective process control
7. planned regular maintenance programmes
8. emergency preparedness and response
9. safeguarding compliance with environmental legislation;
   * + 1. checking performance and taking corrective action, paying particular attention to;
10. monitoring and measurement (see also the JRC Reference Report on Monitoring of emissions to air and water from IED-installations — ROM)
11. corrective and preventive action
12. maintenance of records
13. independent (where practicable) internal and external auditing in order to determine whether or not the EMS conforms to planned arrangements and has been properly implemented and maintained;
    * + 1. review, by senior management, of the EMS and its continuing suitability, adequacy and effectiveness;
        2. following the development of cleaner technologies;
        3. consideration for the environmental impacts from the eventual decommissioning of the installation at the stage of designing a new plant, and throughout its operating life including;
14. avoiding underground structures
15. incorporating features that facilitate dismantling
16. choosing surface finishes that are easily decontaminated
17. using an equipment configuration that minimises trapped chemicals and facilitates drainage or cleaning
18. designing flexible, self-contained equipment that enables phased closure
19. using biodegradable and recyclable materials where possible;
    * + 1. application of sectoral benchmarking on a regular basis. Specifically for this sector, it is also important to consider the following features of the EMS, described where appropriate in the relevant BAT:
        2. quality assurance/quality control programmes to ensure that the characteristics of all fuels are fully determined and controlled (see BAT 9);
        3. a management plan in order to reduce emissions to air and/or to water during other than normal operating conditions, including start-up and shutdown periods (see BAT 10 and BAT 11);
        4. a waste management plan to ensure that waste is avoided, prepared for reuse, recycled or otherwise recovered, including the use of techniques given in BAT 16
        5. a systematic method to identify and deal with potential uncontrolled and/or unplanned emissions to the environment, in particular:
20. emissions to soil and groundwater from the handling and storage of fuels, additives, by-products and wastes
21. emissions associated with self-heating and/or self-ignition of fuel in the storage and handling activities;
    * + 1. a dust management plan to prevent or, where that is not practicable, to reduce diffuse emissions from loading, unloading, storage and/or handling of fuels, residues and additives;
        2. a noise management plan where a noise nuisance at sensitive receptors is expected or sustained, including;
22. a protocol for conducting noise monitoring at the plant boundary
23. a noise reduction programme
24. a protocol for response to noise incidents containing appropriate actions and timelines
25. a review of historic noise incidents, corrective actions and dissemination of noise incident knowledge to the affected parties;
    * + 1. for the combustion, gasification or co-incineration of malodourous substances, an odour management plan including:
26. a protocol for conducting odour monitoring
27. where necessary, an odour elimination programme to identify and eliminate or reduce the odour emissions
28. a protocol to record odour incidents and the appropriate actions and timelines
29. a review of historic odour incidents, corrective actions and the dissemination of odour incident knowledge to the affected parties.

Where an assessment shows that any of the elements listed under items x to xvi are not necessary, a record is made of the decision, including the reasons.

**APPLICABLE. COMPLIANT.**

**SEDAMYL UK Ltd. operates an environmental management system (EMS) certified to ISO 14001:2015 which covers all these points. See attached the ISO 140001 certificate in appendix (A).**

## Monitoring

#### BAT 2

BAT is to determine the net electrical efficiency and/or the net total fuel utilisation and/or the net mechanical energy efficiency of the gasification, IGCC and/or combustion units by carrying out a performance test at full load (1), according to EN standards, after the commissioning of the unit and after each modification that could significantly affect the net electrical efficiency and/or the net total fuel utilisation and/or the net mechanical energy efficiency of the unit. If EN standards are not available, BAT is to use ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality.

**APPLICABLE. COMPLIANT.**

**Sedamyl operates fully automated high performance combustion units with related data measures, logs and compares combustion performance against benchmark data.**

#### BAT3

BAT is to monitor key process parameters relevant for emissions to air and water including those given below:

|  |  |  |  |
| --- | --- | --- | --- |
| Stream | Parameters | Monitoring | Monitored? |
| Flue-gas | Flow | Periodic or continuous determination | **Undertaken periodically by 3rd party accredited**  **monitoring company.** |
| Oxygen content, temperature, and pressure | Periodic or continuous measurement | **Undertaken periodically by 3rd party accredited monitoring company.** |
| Water vapour content |
| Waste water from flue- gas treatment | Flow, pH, and temperature | Continuous measurement | **N/A because flue gas treatment is not required** |

#### BAT4

BAT is to monitor emissions to air with at least the frequency given below and in accordance with EN standards. If EN standards are not available, BAT is to use ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality.

**APPLICABLE. COMPLIANT**

**At the incoming stage of development of the site the total thermal input, given by the sum of the single combustion units thermal input, will be >50MWth. The installation is provided of separate stacks for each combustion unit, bringing the Thermal Power installed linked to each stack below the 50 MWth. The reason because separate stacks have been built is purely addressed by the layout of the combustion units and by the need to raise up the efficiency of the single units with the installation of a new heat recovery heat exchanger.**

**Following a discussion with the local Environment Agency Inspector Sedamyl, would be allowed to proceed with periodical emission surveys instead of continuous emission monitoring.**

#### BAT5

BAT is to monitor emissions to water from flue-gas treatment with at least the frequency given below and in accordance with EN standards. If EN standards are not available, BAT is to use ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality.

**NOT APPLICABLE because no flue-gas treatment systems are required at the installation being Dry Low emission technology design with built in NOX abetment systems installed.**

## General environmental and combustion performance

#### BAT6

In order to improve the general environmental performance of combustion plants and to reduce emissions to air of CO and unburnt substances, BAT is to ensure optimised combustion and to use an appropriate combination of the techniques given below.

|  |  |  |  |
| --- | --- | --- | --- |
| Technique | Description | Applicability | Applied? |
|  | Ensure stable |  |  |
| Fuel blending and mixing | combustion conditions and/or reduce the emission of pollutants by  mixing different qualities of the same fuel type | Generally applicable | **N/A SINGLE FUEL, natural gas from the external network.** |
| Maintenance | Regular planned |  |  |
| of the | maintenance according |  | **YES: Maintenance** |
| combustion | to suppliers' |  | **contracts in place** |
| system | recommendations |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| Advanced control system | See description in Section 8.1 | The applicability to old combustion plants may be constrained by the need to retrofit the combustion system and/or control  command system | **YES: Fully automated and advanced controlled plant**  **<2 years old.** |
| Good design of the  combustion equipment | Good design of furnace, combustion chambers, burners and associated  devices | Generally applicable to new combustion plants | **YES: recently engineered plant <2 years old.** |
| Fuel choice | Select or switch totally or partially to another fuel(s) with a better environmental profile (e.g. with low sulphur and/or mercury content) amongst the available fuels, including in start- up situations or when back-up fuels are used | Applicable within the constraints associated with the availability of suitable types of fuel with a better environmental profile as a whole, which may be impacted by the energy policy of the Member State, or by the integrated site's fuel balance in the case of  combustion of industrial process fuels. For existing combustion plants, the type of fuel chosen may be limited by the configuration and the  design of the plant | **N/A SINGLE FUEL natural gas from the external network.** |

#### BAT7

In order to reduce emissions of ammonia to air from the use of selective catalytic reduction (SCR) and/or selective non-catalytic reduction (SNCR) for the abatement of NOX emissions, BAT is to optimise the design and/or operation of SCR and/or SNCR (e.g. optimised reagent to NOX ratio, homogeneous reagent distribution and optimum size of the reagent drops).

**NOT APPLICABLE because no selective catalytic reduction (SCR) and/or selective non-catalytic reduction (SNCR) systems are installed.**

#### BAT8

In order to prevent or reduce emissions to air during normal operating conditions,

BAT is to ensure, by appropriate design, operation and maintenance, that the emission abatement systems are used at optimal capacity and availability.

**APPLICABLE. COMPLIANT. The modern combustion plant is a Dry Low emission technology design with built in NOX abetment systems.**

#### BAT9

In order to improve the general environmental performance of combustion and/or gasification plants and to reduce emissions to air, BAT is to include the following elements in the quality assurance/quality control programmes for all the fuels used, as part of the environmental management system (see BAT 1):

**APPLICABLE. COMPLIANT. The fuel used is natural gas provided by the National Grid. Technical and Quality details are provided by the fuel supplier.**

1. Initial full characterisation of the fuel used including at least the parameters listed below and in accordance with EN standards. ISO, national or other international standards may be used provided they ensure the provision of data of an equivalent scientific quality;
2. Regular testing of the fuel quality to check that it is consistent with the initial characterisation and according to the plant design specifications. The frequency of testing and the parameters chosen from the table below are based on the variability of the fuel and an assessment of the relevance of pollutant releases (e.g. concentration in fuel, flue-gas treatment employed);
3. Subsequent adjustment of the plant settings as and when needed and practicable (e.g. integration of the fuel characterisation and control in the advanced control system (see description in Section 8.1)).

Initial characterisation and regular testing of the fuel can be performed by the operator and/or the fuel supplier. If performed by the supplier, the full results are provided to the operator in the form of a product (fuel) supplier specification and/or guarantee.

|  |  |  |
| --- | --- | --- |
| Fuel(s) | Substances/Parameters subject to characterisation | Tested? |
| Biomass/peat | LHV | **N/A** |
| Moisture | **N/A** |
| Ash | **N/A** |
| C, Cl, F, N, S, K, Na | **N/A** |
| Metals and metalloids (As, Cd, Cr, Cu, Hg, Pb, Zn) | **N/A** |
| Coal/lignite | LHV | **N/A** |
| Moisture | **N/A** |
| Volatiles, ash, fixed carbon, C, H, N, O, S | **N/A** |
| Br, Cl, F | **N/A** |
| Metals and metalloids (As, Cd, Co, Cr, Cu, Hg, Mn, Ni, Pb, Sb, Tl, V, Zn) | **N/A** |
| HFO | Ash | **N/A** |
| C, S, N, Ni, V | **N/A** |
| Gas oil | Ash | **N/A** |
| N, C, S | **N/A** |
| Natural gas | LHV | **YES** |

|  |  |  |
| --- | --- | --- |
|  | CH4, C2H6, C3, C4+, CO2, N2, Wobbe index | **YES** |
| Process fuels from the chemical industry | Br, C, Cl, F, H, N, O, S | **N/A** |
| Metals and metalloids (As, Cd, Co, Cr, Cu, Hg, Mn, Ni, Pb, Sb, Tl, V, Zn) | **N/A** |
| Iron and steel process gases | LHV, CH4 (for COG), CXHY (for COG), CO2, H2, N2, total  sulphur, dust, Wobbe index | **N/A** |
| Waste | LHV | **N/A** |
| Moisture | **N/A** |
| Volatiles, ash, Br, C, Cl, F, H, N, O, S | **N/A** |
| Metals and metalloids (As, Cd, Co, Cr, Cu, Hg, Mn, Ni, Pb, Sb, Tl, V, Zn) | **N/A** |

#### BAT10

In order to reduce emissions to air and/or to water during other than normal operating conditions (OTNOC), BAT is to set up and implement a management plan as part of the environmental management system (see BAT 1), commensurate with the relevance of potential pollutant releases, that includes the following elements:

1. appropriate design of the systems considered relevant in causing OTNOC that may have an impact on emissions to air, water and/or soil (e.g. low-load design concepts for reducing the minimum start-up and shutdown loads for stable generation in gas turbines),
2. set-up and implementation of a specific preventive maintenance plan for these relevant systems,
3. review and recording of emissions caused by OTNOC and associated circumstances and implementation of corrective actions if necessary,
4. periodic assessment of the overall emissions during OTNOC (e.g. frequency of events, duration, emissions quantification/estimation) and implementation of corrective actions if necessary.

**NOT APPLICABLE because OTNOC of the combustion units consists in the plant start up phase and shut down phase of the duration of max 600 sec. No emission to water. Emissions to air during the start up phase and shut down phase during the transitory phase.**

#### BAT11

BAT is to appropriately monitor emissions to air and/or to water during OTNOC. The monitoring can be carried out by direct measurement of emissions or by monitoring of surrogate parameters if this proves to be of equal or better scientific quality than the direct measurement of emissions. Emissions during start-up and shutdown (SU/SD) may be assessed based on a detailed emission measurement carried out for a typical SU/SD procedure at least once every year, and using the results of this measurement to estimate the emissions for each and every SU/SD throughout the year.

**NOT APPLICABLE because OTNOC of the combustion units consists in the plant start up phase and shut down phase of the duration of max 600 sec. No emission to water. Emissions to air during the start up phase and shut down phase during the transitory phase.**

## Energy efficiency

#### BAT12

In order to increase the energy efficiency of combustion, gasification and/or IGCC units operated ≥ 1 500 h/yr, BAT is to use an appropriate combination of the techniques given below.

|  |  |  |  |
| --- | --- | --- | --- |
| **Technique** | **Description** | **Applicability** | **Applied?** |
| Combustion optimisation | Optimising the combustion minimises the content of unburnt substances in the flue- gases and in solid combustion residues | Generally applicable | **YES,**  The current turbine and combined boiler are efficiently engineered and designed for combined heat and power  applications (CHP), the unit has an overall efficiency of 90%. |
| Optimisation of the working medium conditions | Operate at the highest possible pressure and temperature of the working medium gas or steam, within the constraints associated with, for example, the control of NOX emissions or the  characteristics of energy demanded | **NO** |
| Optimisation of the steam cycle | Operate with lower turbine exhaust pressure by utilisation of the lowest possible temperature of the condenser cooling water, within the  design conditions | **NO** |
| Minimisation of energy consumption | Minimising the internal energy consumption (e.g. greater efficiency of the feed-water  pump) | **YES** |
| Preheating of combustion air | Reuse of part of the heat recovered from the combustion flue- gas to preheat the air used in combustion | Generally applicable within the constraints related to the need to control  NOX emissions | **NO** |
| Fuel preheating | Preheating of fuel using recovered heat | Generally applicable within the constraints associated with the boiler design | **NO** |

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | and the need to  control NOX emissions |  |
| Advanced control system | Computerised control of the main combustion parameters enables the combustion efficiency to be improved | Generally applicable to new units. The applicability to old units may be constrained by the need to retrofit the combustion system and/or  control command system | **YES,**  recent combustion unit design and control system. |
| Feed-water preheating using recovered heat | Preheat water coming out of the steam condenser with recovered heat, before reusing it in the boiler | Only applicable to steam circuits and not to hot boilers.  Applicability to existing units may be limited due to constraints associated with the plant configuration and  the amount of recoverable heat | **YES,**  Preheating of water carried on through heat exchanger on waste flue gases. |
| Heat recovery by cogeneration (CHP) | Recovery of heat (mainly from the steam system) for producing hot water/steam to be used in industrial processes/activities or in a public network for district heating.  Additional heat recovery is possible from: — flue-gas — grate cooling —  circulating fluidised bed | Applicable within the constraints associated with the local heat and power demand. The applicability may be limited in the case of gas compressors with an unpredictable operational heat profile | **YES,**  The Turbine provides waste heat to the attached boilers as part of the CHP: the steam is then used for process purposes. |
| CHP readiness | See description in Section 8.2. | Only applicable to new units where there is a realistic potential for the future use of heat  in the vicinity of the unit | **YES,**  possibility for expansion of the heat recovery loop in case of future other users. |
| Flue-gas condenser | See description in Section 8.2. | Generally applicable to CHP units provided there is enough demand  for low- temperature heat | **N/A.** Heat from flue gases is recovered using a dedicated heat exchanger which brings the flue gases temperature to the minimum value to avoid acid condensation. |

|  |  |  |  |
| --- | --- | --- | --- |
| Heat accumulation | Heat accumulation storage in CHP mode | Only applicable to CHP plants. The applicability may be limited in the case of low heat  load demand | **N/A** |
| Wet stack | See description in Section 8.2. | Generally applicable to new and existing units fitted with wet  FGD | **N/A** |
| Cooling tower discharge | The release of emissions to air through a cooling tower and not via a dedicated stack | Only applicable to units fitted with wet FGD where reheating of the flue-gas is necessary before release, and where the unit  cooling system is a cooling tower | **N/A** |
| Fuel pre-drying | The reduction of fuel moisture content before combustion to improve combustion conditions | Applicable to the combustion of biomass and/or peat within the constraints associated with spontaneous combustion risks (e.g. the moisture content of peat is kept above 40 % throughout the delivery chain).  The retrofit of existing plants may be restricted by the extra calorific value that can be obtained from the drying operation and by the limited retrofit possibilities offered by some boiler designs or plant  configurations | **N/A** |
| Minimisation of heat losses | Minimising residual heat losses, e.g. those that occur via the slag or those that can be reduced by insulating  radiating sources | Only applicable to solid-fuel-fired combustion units and to gasification/IGCC  units | **N/A** |
| Advanced materials | Use of advanced materials proven to be capable of | Only applicable to new plants | **YES,**  recent combustion unit design and steam generators. |

|  |  |  |  |
| --- | --- | --- | --- |
|  | withstanding high operating temperatures and pressures and thus to achieve increased steam/combustion  process efficiencies |  |  |
| Steam turbine upgrades | This includes techniques such as increasing the temperature and pressure of medium- pressure steam, addition of a low- pressure turbine, and modifications to the geometry of the  turbine rotor blades | The applicability may be restricted by demand, steam conditions and/or limited plant lifetime | **YES,**  Future improvement foreseen with increase of steam pressure and temperature 1521 Bar |
| Supercritical and ultra- supercritical steam conditions | Use of a steam circuit, including steam reheating systems, in which steam can reach pressures above 220,6 bar and temperatures above 374 °C in the case of supercritical conditions, and above 250 – 300 bar and temperatures above 580 – 600 °C in the case of ultra- supercritical conditions | Only applicable to new units of ≥ 600 MWth  operated > 4 000 h/yr. Not applicable when the purpose of the unit is to produce low steam temperatures and/or pressures in process industries. Not applicable to gas turbines and engines generating steam in CHP mode.  For units combusting biomass, the applicability may be constrained by high- temperature corrosion in the case of certain  biomasses | **N/A** |

## Water usage and emissions to water

#### BAT13

In order to reduce water usage and the volume of contaminated waste water discharged, BAT is to use one or both of the techniques given below.

|  |  |  |  |
| --- | --- | --- | --- |
| Technique | Description | Applicability | Applied |
| Water recycling | Residual aqueous streams, including run-off water, from the plant are reused for other purposes. The degree of recycling is limited by the quality requirements of the recipient water stream  and the water balance of the plant | Not applicable to waste water from cooling systems when water treatment chemicals and/or high  concentrations of salts from seawater are present | **YES**  Steam condensate is collected and reused in the boiler system. |
| Dry bottom ash handling | Dry, hot bottom ash falls from the furnace onto a mechanical conveyor system and is cooled down by ambient air. No water is used in the  process. | Only applicable to plants combusting solid fuels. There may be technical restrictions that prevent retrofitting to existing combustion plants | **N/A** |

#### BAT14

In order to prevent the contamination of uncontaminated waste water and to reduce emissions to water, BAT is to segregate waste water streams and to treat them separately, depending on the pollutant content.

**NOT APPLICABLE because no polluted water streams are discharged by the combustion activity.**

#### BAT15

In order to reduce emissions to water from flue-gas treatment, BAT is to use an appropriate combination of the techniques given below, and to use secondary techniques as close as possible to the source in order to avoid dilution.

**NOT APPLICABLE because no flue gas treatment with water is required for emission abatement in order to match the limits in NOx and CO.**

## Waste management

#### BAT16

In order to reduce the quantity of waste sent for disposal from the combustion and/or gasification process and abatement techniques, BAT is to organise operations so as to maximise, in order of priority and taking into account life-cycle thinking:

1. waste prevention, e.g. maximise the proportion of residues which arise as by products;
2. waste preparation for reuse, e.g. according to the specific requested quality criteria;
3. waste recycling;
4. other waste recovery (e.g. energy recovery), by implementing an appropriate combination of techniques.

**NOT APPLICABLE because no waste are produced with the current combustion system.**

## Noise emissions

#### BAT17

In order to reduce noise emissions, BAT is to use one or a combination of the techniques given below.

|  |  |  |  |
| --- | --- | --- | --- |
| Technique | Description | Applicability | Applied |
| Optional Measures | These include: —improved inspection and maintenance of equipment — closing of doors and windows of enclosed areas, if possible — equipment operated by experienced staff — avoidance of noisy activities at night, if possible — provisions for noise control  during maintenance activities | Generally applicable | **YES, maintenance contract on going, enclosed areas, equipment doors kept closed.** |
| Low-noise equipment | This potentially includes compressors, pumps and disks | Generally applicable when the equipment is new  or replaced | **YES** |
| Noise attenuation | Noise propagation can be reduced by inserting obstacles between the emitter and the receiver. Appropriate obstacles include protection walls, embankments and buildings | Generally applicable to new plants. In the case of existing plants, the insertion of obstacles may be restricted by lack of  space | **N/A** |
| Noise-control equipment | This includes: — noise- reducers — equipment insulation — enclosure of noisy equipment —  soundproofing of buildings | The applicability may be restricted by lack of space | **YES, main combustion unit fully enclosed in noise proof**  **package.** |
| Appropriate location of equipment and buildings | Noise levels can be reduced by increasing the distance between the emitter and the receiver and by using buildings as noise screens | Generally applicable to new plants. In the case of existing plants, the relocation of equipment and  production units may be restricted | **YES, safe distance kept from critical receptors.** |

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | by lack of space or by excessive costs |  |

* 1. **BAT Conclusions for the combustion of solid fuels (BATc 18-27)**

**NOT APPLICABLE because no solid fuels are used at the installation.**

* 1. **BAT conclusions for the combustion of liquid fuels (BATc 28-39)**

**NOT APPLICABLE because no liquid fuels are used at the installation.**

## BAT conclusions for the combustion of gaseous fuels

### BAT conclusions for the combustion of natural gas

### Energy efficiency

#### BAT40

In order to increase the energy efficiency of natural gas combustion, BAT is to use an appropriate combination of the techniques given in BAT 12 and below.

**APPLICABLE. COMPLIANT. The steam produced by cogeneration CHP is used into the process as thermal vector. The steam is also used to run a steam turbine which provides compressed air to the plant for process purposes.**

|  |  |  |  |
| --- | --- | --- | --- |
| **Technique** | **Description** | **Applicability** | **Applied** |
| Combined cycle | See description in Section 8.2 | Generally applicable to new gas turbines and engines except when operated < 1  500 h/yr. Applicable to existing gas turbines and engines within the constraints associated with the steam cycle design and the space availability. Not applicable to existing gas turbines and engines operated < 1 500 h/yr. Not applicable to mechanical drive gas turbines operated in discontinuous mode with extended load variations and frequent start-ups and  shutdowns. Not applicable to boilers | **N/A** |

### NOx, NMVOC and CH4 emissions to air

#### BAT41

In order to prevent or reduce NOX emissions to air from the combustion of natural gas in boilers, BAT is to use one or a combination of the techniques given below.

|  |  |  |  |
| --- | --- | --- | --- |
| Technique | Description | Applicability | Applied |
| Air and/or fuel staging | See descriptions in Section  8.3. Air staging is often associated with low-NOX burners | Generally applicable | **N/A** |
| Flue-gas recirculation | See description in Section 8.3 | **N/A** |
| Low-NOX burners (LNB) | **YES** |
|  | See description in Section | The applicability to old combustion plants may be constrained by the need to retrofit the combustion system and/or control  command system |  |
|  | 8.3. This technique is often |  |
| Advanced control system | used in combination with  other techniques or may be | **YES** |
|  | used alone for combustion |  |
|  | plants operated < 500 h/yr |  |
|  |  | Generally applicable |  |
| Reduction of the combustion air temperature |  | within the constraints associated with the | **N/A** |
|  |  | process needs |  |
|  |  | Not applicable to |  |
|  |  | combustion plants |  |
|  |  | operated < 500 h/yr |  |
|  |  | with highly variable |  |
|  |  | boiler loads. The |  |
| Selective non– catalytic  reduction (SNCR) |  | applicability may be  limited in the case of | **N/A** |
|  |  | combustion plants |  |
|  |  | operated between |  |
|  |  | 500 h/yr and 1 500 |  |
|  | See description in Section | h/yr with highly |  |
|  | 8.3 | variable boiler loads |  |
|  |  | Not applicable to |  |
|  |  | combustion plants |  |
|  |  | operated < 500 h/yr. |  |
|  |  | Not generally |  |
|  |  | applicable to |  |
|  |  | combustion plants of |  |
| Selective catalytic reduction (SCR) |  | < 100 MWth. There may be technical and | **N/A** |
|  |  | economic restrictions |  |
|  |  | for retrofitting existing |  |
|  |  | combustion plants |  |
|  |  | operated between |  |
|  |  | 500 h/yr and 1 500 |  |
|  |  | h/yr |  |

#### BAT42

In order to prevent or reduce NOX emissions to air from the combustion of natural gas in gas turbines, BAT is to use one or a combination of the techniques given below.

|  |  |  |  |
| --- | --- | --- | --- |
| **Technique** | **Description** | **Applicability** | **Applied** |
| Advanced control system | See description in Section 8.3. This technique is often used in combination with other techniques or may be used alone for combustion plants  operated < 500 h/yr | The applicability to old combustion plants may be constrained by the need to retrofit the combustion system  and/or control command system | **YES, recent system design.** |
| Water/steam addition | See description in Section 8.3 | The applicability may be limited due to water availability | **NO** |
| Dry low-NOX burners (DLN) | The applicability may be limited in the case of turbines where a retrofit package is not available or when water/steam addition systems are  installed | **NO** |
| Low-load design concept | Adaptation of the process control and related equipment to maintain good combustion efficiency when the demand in energy varies, e.g. by improving the inlet airflow control capability or by splitting the combustion process into decoupled  combustion stages | The applicability may be limited by the gas turbine design | **NO** |
| Low-NOX burners (LNB) | See description in Section 8.3 | Generally applicable to supplementary firing for heat recovery steam generators (HRSGs) in the case of combined- cycle gas turbine (CCGT) combustion  plants | **YES**  Low NOx burners are installed |
| Selective catalytic reduction (SCR) | Not applicable in the case of combustion plants operated < 500 h/yr. Not generally  applicable to existing combustion plants of < | **NO** |

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | 100 MWth. Retrofitting existing combustion  plants may be constrained by the availability of sufficient space. There may be technical and economic restrictions for  retrofitting existing  combustion plants operated between 500  h/yr and 1 500 h/yr |  |

#### BAT43

In order to prevent or reduce NOX emissions to air from the combustion of natural gas in engines, BAT is to use one or a combination of the techniques given below.

**NOT APPLICABLE, because no engines (without considering turbines) fed by natural gas are installed on site.**

#### BAT44

In order to prevent or reduce CO emissions to air from the combustion of natural gas, BAT is to ensure optimised combustion and/or to use oxidation catalysts.

**APPLICABLE. COMPLIANT: Optimised combustion values set by the supplier of the combustion unit considering the data provided on the fuel by the National Gas Network.**

#### BAT45

In order to reduce non-methane volatile organic compounds (NMVOC) and methane (CH4) emissions to air from the combustion of natural gas in spark-ignited lean-burn gas engines, BAT is to ensure optimised combustion and/or to use oxidation catalysts.

**NOT APPLICABLE because no spark-ignited lean-burn gas engines are installed on site.**

* 1. **BAT conclusions for the combustion of iron and steel process gases (BATc46-51)**

**NOT APPLICABLE because no combustion facilities for iron and steel process gases are installed on site.**

* 1. **BAT conclusions for the combustion of gaseous and/or liquid fuels on offshore platforms (BATc 52-54)**

**NOT APPLICABLE because no offshore platforms are present in the installation.**

* 1. **BAT conclusions for multi-fuel-fired plants (BATc 55-59)**

**NOT APPLICABLE because no multi fuel fired plants are present in the installation.**

* 1. **BAT conclusions for the co-incineration of waste (BATc 60-71) NOT APPLICABLE because no co-incineration of waste is performed.**
  2. **BAT conclusions for gasification (BATc 72-75) NOT APPLICABLE because no gasification is performed.**

# Common Waste Water

## Environmental Management Systems

#### BAT1

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

* + 1. commitment of the management, including senior management;
    2. an environmental policy that includes the continuous improvement of the installation by the management;
    3. planning and establishing the necessary procedures, objectives and targets, in conjunction with financial planning and investment;
    4. implementation of procedures paying particular attention to:

1. structure and responsibility;
2. recruitment, training, awareness and competence;
3. communication;
4. employee involvement;
5. documentation;
6. effective process control;
7. maintenance programmes;
8. emergency preparedness and response;
9. safeguarding compliance with environmental legislation;
   * 1. checking performance and taking corrective action, paying particular attention to:
10. monitoring and measurement (see also the Reference Report on Monitoring of emissions to Air and Water from IED installations — ROM);
11. corrective and preventive action;
12. maintenance of records;
13. independent (where practicable) internal or external auditing in order to determine whether or not the EMS conforms to planned arrangements and has been properly implemented and maintained;
    * 1. review of the EMS and its continuing suitability, adequacy and effectiveness by senior management;
      2. following the development of cleaner technologies;
      3. consideration for the environmental impacts from the eventual decommissioning of the plant at the design stage of a new plant, and throughout its operating life;
      4. application of sectoral benchmarking on a regular basis;
      5. waste management plan (see BAT 13).

Specifically for chemical sector activities, BAT is to incorporate the following features in the EMS:

* + 1. on multi-operator installations/sites, establishment of a convention that sets out the roles, responsibilities and coordination of operating procedures of each plant operator in order to enhance the cooperation between the various operators;
    2. establishment of inventories of waste water and waste gas streams (see BAT 2).

In some cases, the following features are part of the EMS:

* + 1. odour management plan (see BAT 20)
    2. noise management plan (see BAT 22).

**APPLICABLE COMPLIANT**

**SEDAMYL UK Ltd. operates an environmental management system (EMS) certified to ISO 14001:2015 which covers all these points. See attached the ISO 140001 certificate in appendix (A).**

#### BAT2

In order to facilitate the reduction of emissions to water and air and the reduction of water usage, BAT is to establish and to maintain an inventory of waste water and waste gas streams, as part of the environmental management system (see BAT 1), that incorporates all of the following features:

1. information about the chemical production processes, including:
2. chemical reaction equations, also showing side product
3. simplified process flow sheets that show the origin of the emissions;
4. descriptions of process-integrated techniques and waste water/waste gas treatment at source including their performances;
5. information, as comprehensive as is reasonably possible, about the characteristics of the waste water streams, such as:
6. average values and variability of flow, pH, temperature, and conductivity;
7. average concentration and load values of relevant pollutants/parameters and their variability (e.g. COD/TOC, nitrogen species, phosphorus, metals, salts, specific organic compounds);
8. data on bioeliminability (e.g. BOD, BOD/COD ratio, Zahn-Wellens test, biological inhibition potential (e.g. nitrification));
9. information, as comprehensive as is reasonably possible, about the characteristics of the waste gas streams, such as:
10. average values and variability of flow and temperature;
11. average concentration and load values of relevant pollutants/parameters and their variability (e.g. VOC, CO, NOX, SOX, chlorine, hydrogen chloride);
12. flammability, lower and higher explosive limits, reactivity;
13. presence of other substances that may affect the waste gas treatment system or plant safety (e.g. oxygen, nitrogen, water vapour, dust).

**APPLICABLE.COMPLIANT. Complete data collection on production processes, waste water streams and waste biogas stream. This data is recorded from a series of continuous monitoring, regular sampling and spot tests and recorded in a series of spreadsheets to track compliance which can be made available on request.**

## Monitoring

#### BAT3

For relevant emissions to water as identified by the inventory of waste water streams (see BAT 2), BAT is to monitor key process parameters (including continuous monitoring of waste water flow, pH and temperature) at key locations (e.g. influent to pretreatment and influent to final treatment).

**APPLICABLE: COMPLIANT – Continuous Sampling and automated monitoring at outlet with daily laboratory samples collected and analysed.**

#### BAT4

BAT is to monitor emissions to water in accordance with EN standards with at least the minimum frequency given below. If EN standards are not available, BAT is to use ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality.

**APPLICABLE. COMPLIANT. It should be noted that Nitrogen, Phosphorous, Halogens, Metals or toxic bacteria are not added during the process, therefore the facility does not generate any additional emissions above the background within the water supply.**

****

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Substance/Parameter** | | **Standard(s)** | **Min monitoring frequency** | **Monitored?** |
| Total organic carbon (TOC) | | EN 1484 | Daily | **YES** |
| Chemical oxygen demand (COD) | | No EN standard available | **YES** |
| Total suspended solids (TSS) | | EN 872 | **YES** |
| Total nitrogen (TN) | | EN 12260 | **Sampled as part of V009 and further monitoring to be undertaken at the request of Local EA officer. An example of the sampling have been attached above. Additional results are available on request.** |
| Total inorganic nitrogen (Ninorg) | | Various EN standards available |
| Total phosphorus (TP) | | Various EN standards available |
| Adsorbable organically bound halogens (AOX) | | EN ISO 9562 | Monthly |
| Metals | Cr | Various EN standards available | Monthly | **Sampled as part of V009 and further monitoring to be undertaken at the request of Local EA officer. Results of Sampling can be found in H1 for V009 and V010** |
| Cu |
| Ni |
| Pb |
| Zn |
| Other metals, if relevant |
| Toxicity | Fish eggs (Danio rerio) | EN ISO 15088 | To be decided based on a risk assessment, after an intial character acterisation | **N/A** |
| Daphnia (Daphnia magna Straus) | EN ISO 6341 | **N/A** |
| Luminescent bacteria (Vibrio fischeri) | EN ISO 11348-1,  EN ISO 11348-2 or EN ISO 11348- 3 | **N/A** |
| Duckweed (Lemna minor) | EN ISO 20079 | **N/A** |
| Algae | EN ISO 8692, EN ISO 10253 or EN ISO 10710 | **N/A** |

#### BAT5

BAT is to periodically monitor diffuse VOC emissions to air from relevant sources by using an appropriate combination of the techniques I-III or, where large amounts of VOC are handled, all of the techniques I-III.

1. sniffing methods (e.g. with portable instruments according to EN 15446) associated with correlation curves for key equipment;
2. optical gas imaging methods;
3. calculation of emissions based on emissions factors, periodically validated (e.g. once every two years) by measurements.

**APPLICABLE. Sedamyl currently performs weekly boundary odour assessment which does not represent BAT for fugitive emissions control. Sedamyl commits to undertake periodical fugitive emission surveys to identified sources undertaking one of the techniques mentioned in the BAT5 and satisfy the requirement before or within the compliance date of 07/12/2021.**

#### BAT6

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

**APPLICABLE. COMPLIANT. Sedamyl carries out periodical Sniff testing at the relevant receptors in order to monitor odour emissions. The monitoring plan is part of the EMS through its procedure “SED EWI-008 Internal odour and noise monitoring”. Records are kept with the usage of forms suggested by the M4 Odour Management.**

## Emissions to Water

### Water Usage and Waste Water Generation

#### BAT7

In order to reduce the usage of water and the generation of waste water, BAT is to reduce the volume and/or pollutant load of waste water streams, to enhance the reuse of waste water within the production process and to recover and reuse raw materials.

**APPLICABLE. COMPLIANT. Process water is recovered from dedicated evaporator and recirculated to reduce waste water output.**

**The Wastewater Treatment Plant Upgrade will involve the construction of an additional Membrane Bio-reactor (MBR) plant formed by the Aerobic Tank 4765\_10TK1 and the UF (tank already in place but being raised for an increase capacity), a Sludge Dewatering plant formed by a decanter centrifuge, polyelectrolytes make down unit and sludge container and the shifting of 4762\_30TK1 RO3 from UASB reactor to Acidification / Equalization tank. For a visual differentiation in between the old and new sections please refer to SED C3-3a-20.**

### Waste Water Collection and Segregation

#### BAT8

In order to prevent the contamination of uncontaminated water and to reduce emissions to water, BAT is to segregate uncontaminated waste water streams from waste water streams that require treatment.

**APPLICABLE. COMPLIANT. Separate collection of foul, process and surface waters.**

#### BAT9

In order to prevent uncontrolled emissions to water, BAT is to provide an appropriate buffer storage capacity for waste water incurred during other than normal operating conditions based on a risk assessment (taking into account e.g. the nature of the pollutant, the effects on further treatment, and the receiving environment), and to take appropriate further measures (e.g. control, treat, reuse).

**APPLICABLE. COMPLIANT. Emergency collection buffer tank present on site. The plant has a drainage system formed by two sumps, north and south side, with the possibility to pump into an emergency storage concrete tank of 5100 m3 capacity or directly to the 4760\_70TK1 River Outfall Tank.**

### Waste Water Treatment

#### BAT10

In order to reduce emissions to water, BAT is to use an integrated waste water management and treatment strategy that includes an appropriate combination of the techniques in the priority order given below.

|  |  |
| --- | --- |
| **Technique** | **Applied?** |
| Process-integrated techniques | **YES,** Optimising the amount of water used and recycled throughout the  process. |
| Recovery of pollutants at source | **YES,** CIP activities and wet washing will be limited to the wet mill and the distillery area. |
| Waste water pretreatment | **N/A** |
| Final waste water treatment | **YES,** with all waste liquid streams physically collected, equalised and fed to the WWTP. |

**For a full explanation of the plant and techniques designed to reduce emissions to water please see SED-C3-3a-2 Technical Description V010. This document provides a detailed breakdown of the WWTP and processes prior to the plant.**

#### BAT11

In order to reduce emissions to water, BAT is to pretreat waste water that contains pollutants that cannot be dealt with adequately during final waste water treatment by using appropriate techniques.

**NOT APPLICABLE: Not Required as influent only requires relatively minor treatment prior to discharge.**

#### BAT12

In order to reduce emissions to water, BAT is to use an appropriate combination of final waste water treatment techniques.

|  |  |  |  |
| --- | --- | --- | --- |
| **Technique** | **Typical Pollutants Abated** | **Applicability** | **Applied?** |
| ***Preliminary and primary treatment*** | | | |
| Equalisation | All pollutants | Generally applicable. | **YES** |
| Neutralisation | Acids, alkalis | **YES** |
| Physical separation, e.g. screens, sieves, grit separators, grease separators or primary settlement  tanks | Suspended solids, oil/grease | **YES** |
| ***Biological treatment (secondary treatment), e.g.*** | | | |
| Activated sludge process | Biodegradable organic compounds | Generally applicable. | **YES** |
| Membrane bioreactor | **YES** |

**The existing Wastewater Treatment plant (WWTP) at present is formed by an emergency concrete tank 4761\_80TK1, three UASB anaerobic reactors RO1/RO2/RO3, a Biogas Holder 4764\_80TK1 with a Flare Stack and a River Outfall Tank 4760\_70TK1 collecting the flows prior discharge into the river Ouse. The reactors account for the entire COD reduction required for meeting the river limit discharge at present (see SED C3-3a-20).**

**The Wastewater Treatment Plant Upgrade will involve the construction of an additional Membrane Bio-reactor (MBR) plant formed by the Aerobic Tank 4765\_10TK1 and the UF (tank already in place but being raised for an increase capacity), a Sludge Dewatering plant formed by a decanter centrifuge, polyelectrolytes make down unit and sludge container and the shifting of 4762\_30TK1 RO3 from UASB reactor to Acidification / Equalization tank. For a visual differentiation in between the old and new sections please refer to SED C3-3a-20.**

|  |  |  |  |
| --- | --- | --- | --- |
| ***Nitrogen removal*** | | | |
| Nitrification/denitrification | Total nitrogen, ammonia | Nitrification may not be applicable in case of high chloride concentrations (i.e. around 10 g/l) and provided that the reduction of the chloride concentration prior to nitrification would not be justified by the environmental benefits. Not applicable when the final treatment does not include a  biological treatment. | **N/A** |
| ***Phosphorus removal*** | | | |
| Chemical precipitation | Phosphorus | Generally applicable. | **N/A** |
| ***Final solids removal*** |  | | |
| Coagulation and flocculation | Suspended solids | Generally applicable. | **NO** |
| Sedimentation | **NO** |
| Filtration (e.g. sand filtration, microfiltration, ultrafiltration) | **YES** |
| Flotation | **NO** |

**APPLICABLE. COMPLIANT. Sedamyl monitors its emissions to water in regards of the substances released by its process. Matter of monitoring are TSS, COD, BOD, Hydrocarbon Oil Index.**

As detailed below, the proposed limits for V010;

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Release Point | Name | Parameter | Current limit | Proposed limit |
| W1 | Emission to Water | Instantaneous flow | 260 | 340 |
| 24 hour flow | 4320 | 6240 (260average) |
| Temperature | 30 | 35 |
| COD | 100 | 130 |
| BOD | 20 | 50 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Report Type | Release Point | Name | Reporting Period | Monitoring Standard |
| Flow | W1 | Emission to Water | Continuous | MCERTS |
| Flow | W1 | Emission to Water | Continuous | MCERTS |
| COD | W1 | Emission to Water | Daily | ISO 15705 |
| COD | W1 | Emission to Water | Daily | ISO 15705 |
| BOD | W1 | Emission to Water | Daily | EN 1899-1 |
| BOD | W1 | Emission to Water | Daily | EN 1899-1 |
| TSS | W1 | Emission to Water | Daily | BS EN 872 |
| TSS | W1 | Emission to Water | Daily | BS EN 872 |
| OIL | W1 | Emission to Water | Monthly | BS EN ISO 9377-2 |
| Temperature | W1 | Emission to Water | Continuous | Verified temperature probe |

#### BAT13

In order to prevent or, where this is not practicable, to reduce the quantity of waste being sent for disposal, BAT is to set up and implement a waste management plan as part of the environmental management system (see BAT 1) that, in order of priority, ensures that waste is prevented, prepared for reuse, recycled or otherwise recovered.

**APPLICABLE. COMPLIANT. Waste management system in place in accordance with EMS and ISO 14001:2015**

#### BAT14

In order to reduce the volume of waste water sludge requiring further treatment or disposal, and to reduce its potential environmental impact, BAT is to use one or a combination of the techniques given below.

**APPLICABLE. COMPLIANT. In order to minimise the volume of waste water sludge requiring further treatment or disposal one of the techniques used is to maximise the previous re-usage of process water and limiting product losses from cleaning, spillages etc. as these losses are treated within the waste water treatment plant; a key point is the optimisation of the amount of water used and recycled throughout the process. Dry cleaning procedures are used wherever possible with the wet and dry processes separated as part of the design. CIP activities and wet washing are limited to the wet mill and the distillery area with all waste liquid streams physically collected, equalised and fed to the WWTP. It is considered that the segregated design of the installation minimises the amount of water required for cleaning purposes.**

**Stabilisation techniques are used such as aerobic and anaerobic digestion.**

**Sedimentation is also used to reduce the volume of filter cake in the anaerobic digestion facility.**

**The Wastewater Treatment Plant Upgrade will involve the construction of an additional Membrane Bio-reactor (MBR) plant formed by the Aerobic Tank 4765\_10TK1 and the UF (tank already in place but being raised for an increase capacity), a Sludge Dewatering plant formed by a decanter centrifuge, polyelectrolytes make down unit and sludge container and the shifting of 4762\_30TK1 RO3 from UASB reactor to Acidification / Equalization tank.**

## Emissions to Air

### Waste Gas Collection

#### BAT15

In order to facilitate the recovery of compounds and the reduction of emissions to air, BAT is to enclose the emission sources and to treat the emissions, where possible.

**APPLICABLE. COMPLIANT. The waste gas sources are fully enclosed. The Biogas of the Waste Water Treatment Plant is then flared. Fermentation waste gases are collected being an anaerobic reaction, so the system is fully enclosed and gases sent to treatment.**

**It is proposed to recover this carbon dioxide, liquify it and store it for sale. To achieve this, a new carbon dioxide capture and storage plant will be constructed.**

### Waste Gas Treatment

#### BAT16

In order to reduce emissions to air, BAT is to use an integrated waste gas management and treatment strategy that includes process-integrated and waste gas treatment techniques.

**APPLICABLE: COMPLIANT. Waste gas is burnt with a flare system, currently not efficient to feed back into combustion systems, due to the low volume of gas created, its location within the facility and the processing energy required to make it suitable for the turbines.**

**Waste gases from fermentation tanks processed by wet scrubbing and periodical monitoring of the emission source as set by Environmental Permit.**

### Flaring

#### BAT17

In order to prevent emissions to air from flares, BAT is to use flaring only for safety reasons or non-routine operational conditions (e.g. start-ups, shutdowns) by using one or both of the techniques given below.

**NOT APPLICABLE: Following discussion with Local Environment Agency Compliance officers, it is currently not efficient to feed back into gas recovery system due to the low volume of gas created, its location within the facility and the processing energy required to make it suitable for the turbines.**

#### BAT18

In order to reduce emissions to air from flares when flaring is unavoidable, BAT is to use one or both of the techniques given below.

|  |  |  |  |
| --- | --- | --- | --- |
| **Technique** | **Description** | **Applicability** | **Applied?** |
| Correct design of flaring devices | Optimisation of height, pressure, assistance by steam, | Applicable to new flares. In existing | **N/A** |

|  |  |  |  |
| --- | --- | --- | --- |
|  | air or gas, type of flare tips (either enclosed or shielded), etc., aimed to enable smokeless and reliable operation and to ensure the efficient combustion of excess  gases. | plants, applicability may be restricted due to e.g. maintenance time availability during the turnaround of the  plant. |  |
| Monitoring and recording as part of flare management | Continuous monitoring of the gas sent to flaring, measurements of gas flow and estimations of other parameters (e.g. composition, heat content, ratio of assistance, velocity, purge gas flow rate, pollutant emissions (e.g. NOX, CO, hydrocarbons, noise)). The recording of flaring events usually includes the estimated/ measured flare gas composition, the estimated/measured flare gas quantity and the duration of operation. The recording allows for the quantification of emissions and the potential  prevention of future flaring events. | Generally applicable. | **YES,** compliant; monitoring and recording of flows, quantities, flare events. |

### Diffuse VOC Emissions

#### BAT19

In order to prevent or, where that is not practicable, to reduce diffuse VOC emissions to air, BAT is to use a combination of the techniques given below.

**APPLICABLE: COMPLIANT.**

**In order to prevent diffuse VOC emissions to air Sedamyl considers in the development of its projects to limit the number of potential emission sources. Maintenance schedules and enclosed systems designs are aimed to maximize the containment of potential diffuse VOC emissions. The waste gas streams are controlled and periodical monitored where requested by the Environment Agency. Wet scrubbing system in place for fermentation area, looking for development on its performances (see LVOC BAT review). The WWTP is a fully enclosed system.**

### Odour Emissions

#### BAT20

In order to prevent or, where that is not practicable, to reduce odour emissions, BAT is to set up, implement and regularly review an odour management plan, as part of the environmental management system (see BAT 1), that includes all of the following elements:

* + - 1. a protocol containing appropriate actions and timelines;
      2. a protocol for conducting odour monitoring;
      3. a protocol for response to identified odour incidents;
      4. an odour prevention and reduction programme designed to identify the source(s); to measure/estimate odour exposure; to characterise the contributions of the sources; and to implement prevention and/or reduction measures.

**APPLICABLE: COMPLIANT. Sedamyl within its EMS certified ISO 14001 manages odour prevention, monitoring, response. A system is so implemented to follow up and keep track of action plans agreed.**

#### BAT21

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

|  |  |  |  |
| --- | --- | --- | --- |
| **Technique** | **Description** | **Applicability** | **Applied?** |
| Minimise residence times | Minimise the residence time of waste water and sludge in collection and storage systems, in particular under anaerobic conditions. | Applicability may be restricted in the case of existing collection and storage  systems. | **YES,**  residence time kept under control. |
| Chemical treatment | Use chemicals to destroy or to reduce the formation of odorous compounds (e.g. oxidation or precipitation of  hydrogen sulphide). | Generally applicable. | **N/A** |
| Optimise aerobic treatment | This can include: (i) controlling the oxygen content; (ii) frequent maintenance of the aeration system; (iii) use of pure oxygen; (iv) removal of scum in tanks. | Generally applicable. | **N/A** |
| Enclosure | Cover or enclose facilities for collecting and treating waste water and sludge to collect the odorous waste gas for further  treatment. | Generally applicable. | **YES,** the system is fully  enclosed. |
| End-of-pipe treatment | This can include: (i) biological treatment;  (ii) thermal oxidation. | Biological treatment is only applicable to compounds that are easily soluble in water and readily bio  eliminable. | **N/A** |

### Noise Emissions

#### BAT22

In order to prevent or, where that is not practicable, to reduce noise emissions, BAT is to set up and implement a noise management plan, as part of the environmental management system (see BAT 1), that includes all of the following elements:

* + - 1. a protocol containing appropriate actions and timelines;
      2. a protocol for conducting noise monitoring;
      3. a protocol for response to identified noise incidents;
      4. a noise prevention and reduction programme designed to identify the source(s), to measure/estimate noise exposure, to characterise the contributions of the sources and to implement prevention and/or reduction measures.

**APPLICABLE: COMPLIANT. Sedamyl within its EMS certified ISO 14001 manages noise prevention, monitoring, response. A system is so implemented to follow up and keep track of action plans agreed.**

#### BAT23

In order to prevent or, where that is not practicable, to reduce noise emissions, BAT is to use one or a combination of the techniques given below.

|  |  |  |  |
| --- | --- | --- | --- |
| **Technique** | **Description** | **Applicability** | **Applied?** |
| Appropriate location of equipment and buildings | Increasing the distance between the emitter and the receiver and using buildings as noise  screens. | For existing plants, the relocation of equipment may be restricted by a lack of space or  excessive costs. | **YES,** in the project phase the layout of a plant is set taking in consideration the  noise issue as well. |
| Operational measures | This includes: (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 during  maintenance activities. | Generally applicable. | **YES,** periodical maintenance in place. |
| Low-noise equipment | This includes low-noise compressors, pumps and flares. | Applicable only when the equipment is new or replaced. | **YES,** low noise motors are preferred. |
| Noise-control equipment | This includes: (i) noise- reducers; (ii) equipment insulation; (iii) enclosure of noisy equipment; (iv) soundproofing of  buildings. | Applicability may be restricted due to space requirements (for existing plants), health, and safety issues. | **YES,** noise screens or noise attenuation enclosure are installed on site on critical equipment. |
| Noise abatement | Inserting obstacles between emitters and receivers (e.g. protection walls, embankments and buildings). | Applicable only to existing plants; since the design of new plants should make this technique unnecessary. For existing plants, the insertion of obstacles  may be restricted by a lack of space. | **YES,** the location is surrounded with  embankments on south east side. |

# Food, Drink And Milk Industries

| **BAT No.** | **Topic** | **Brief Description** | **BAT** | **BAT- AEL** | **Operating to BAT?** | **BAT-AEL derogation needed?** | **Comments** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **General BAT Conclusions** | | | | | | | |
| **1** | Environmental Management Systems | To improve overall environmental performance | Implement and adhere to an EMS that incorporates key features identified | N/A | Yes | N/A | **SEDAMYL UK Ltd. operates an environmental management system (EMS) certified to ISO 14001:2015 which covers all these points.** This system (as referenced in SED-C2-3d-1) is audited internally and externally on an annual basis. As an overview, the system includes the following key components: • EMS Summary Document / Manual • Identification of the needs and expectations of interested parties • Environmental Policy • Aspects and Impacts Register • Compliance Obligations Register • Environmental objectives, targets and management programmes • Operational controls • Records of near-misses, incidents, complaints and non-conformities • Annual management review meetings |
| **2** | Environmental Management Systems | To increase resource efficiency and to reduce emissions - establish, maintain and regularly review an inventory of; water, energy and raw materials consumption as well as of waste water and waste gas streams, as part of the environmental management system. | Incorporate features identified. | N/A | Yes | N/A | Sedamyl have established, maintain and regularly review an inventory of; water, energy and raw materials consumption as well as of waste water and waste gas streams, as part of the environmental management system.   A process flow is illustrated in the site's Plan (see Supporting Documents folder). This diagram shows a majority of the origins of emissions (water, energy, raw materials and waste). Information about water consumption and usage is recorded in a spreadsheet. Weekly, the organisation collect information about the quantity and characteristics of the waste water including ammonia levels, estimated BOD, COD, suspended solids and pH etc. The site utilise this data to make adjustments and/or improvements to the waste water treatment system where necessary and also use it to inform environmental objectives and targets. A raw materials inventory is held, maintained and monitored.  Waste is measured and monitored. Each waste stream is measured in per tonne of finished product to provide meaningful and useful data to the site. Based on this data, the site set environmental objectives and targets.  Waste electricity and gas are also measured and monitored. Figures are recorded monthly and measured in per tonne of finished product to provide meaningful and useful data to the site. The data is used to evaluate waste energy per tonne of finished product. |
| **3** | Monitoring: Emissions to water | Monitoring of relevant emissions to water as identified by the inventory of waste water streams (see BAT 2). | BAT is to monitor key process parameters (e.g. continuous monitoring of waste water flow, pH and temperature) at key locations (e.g. at the inlet and/or outlet of the pre-treatment, at the inlet to the final treatment, at the point where the emission leaves the installation). | N/A | Yes | N/A | Continuous Sampling and automated monitoring at outlet with daily laboratory samples collected and analysed in compliance with site permitted requirements. |
| **4** | Monitoring frequency: Emissions to water | Monitor emissions to water with at least the frequency identified and in accordance with EN standards. | See prescribed parameter and monitoring frequency. | N/A | Yes | N/A | Refer to wetransfer\_2021-outfall-analysis\_2021-11-12\_1602. |
| **5** | Monitoring frequency: Channelled emissions to air | Frequency of monitoring | Required frequency of monitoring for channellised emissions to air of dust, PM, TVOC, NOx, CO, and SOx. | N/A | N/A | N/A | APPLICABLE. Sedamyl UK carries out periodical air emission control surveys within the frequency requested by its Environmental Permit according to the BS EN 14792 for Oxides of Nitrogen, BS EN 13284-1 for particulate, BS EN 12619 for VOC for all the stacks listed. |
| **6** | Energy Efficiency | Increase energy efficiency | Energy efficiency plan & Combination of various common techniques | N/A | Yes | N/A | An energy efficiency plan makes up part of Sedamyl's ISO 14001 certified EMS. The site monitor, measure and record electricity and gas consumption. The energy consumption data is utilised to inform annual energy objectives and targets which are reviewed by the site's Senior Management Team.  To further increase energy efficiency the site also: - Install LED lighting as and when lighting needs to be replaced - Install variable speed drives on equipment - Conduct air leak surveys - Conduct thermographic monitoring of hot and cold systems - Install and monitor insulation on hot and cold systems. |
| **7** | Water Consumption and waste water discharge | Reduce water consumption and the volume of waste water discharged | Water recycling and/or reuse & one or combination of various techniques | N/A | No | N/A | Limiting product losses from cleaning, spillages etc. As these losses are treated within the waste water treatment plant (WWTP), the losses are benchmarked and targeted for action as kg COD/tonne wheat;  Optimising the amount of water used and recycled throughout the process, water usage and water recycled are benchmarked against industry standards and within the group. Dry cleaning procedures are used wherever possible with the wet and dry processes separated as part of the design. CIP activities and wet washing are limited to the wet mill and the distillery area with all waste liquid streams physically collected, equalised and fed to the WWTP. It is considered that the segregated design of the installation minimises the amount of water required for cleaning purposes. |
| **8** | Harmful Substances | Prevent or reduce use of harmful substances | One or a combination of various techniques | N/A | Yes | N/A | Harmful substances used are kept to a minimum to meet with hygiene and food safety standards. When selecting the substances, hygiene and food safety requirements are taken into account. |
| **9** | Harmful Substances: ozone-depleting substances and high global warming potential substances | Prevent emissions of ODS and substances with high GWP. | Use refrigerates without ozone depleting potential and with a low global warming potential. | N/A | Yes | N/A | Ozone depleting substances are chosen to ensure compliance with regulations and a register of gasses with GWPs is held on file.  The site has also had its 5-year energy assessments carried out on its air conditioning units in line with the Energy Performance of Buildings Regulations 2012 as amended. Recently, the air conditioning units in the Main Building were assessed by a qualified Energy Assessor, accredited by the Sterling Accreditation Limited. |
| **10** | Resource Efficiency | Increase resource efficiency | One or a combination of various techniques | N/A | Yes | N/A | Sedamyl implement and aim to achieve annual environmental objectives and targets which largely are based on increasing resource efficiency. Sedamyl operates fully automated high performance combustion units with related data measures, logs and compares combustion performance against benchmark data.  Limiting product losses from cleaning, spillages etc. As these losses are treated within the waste water treatment plant (WWTP), the losses are benchmarked and targeted for action as kg COD/tonne wheat;  Optimising the amount of water used and recycled throughout the process, water usage and water recycled are benchmarked against industry standards and within the group. Dry cleaning procedures are used wherever possible with the wet and dry processes separated as part of the design. CIP activities and wet washing are limited to the wet mill and the distillery area with all waste liquid streams physically collected, equalised and fed to the WWTP. It is considered that the segregated design of the installation minimises the amount of water required for cleaning purposes. |
| **11** | Emissions to water | Prevent uncontrolled emission to water | Provide appropriate buffer storage capacity for waste water. | N/A | Yes | N/A | There is an appropriate buffer storage capacity for waste water on site to prevent uncontrolled emission to water and to ensure that waste water is only discharged after appropriate treatment measures have been taken.  **Emergency collection buffer tank present on site. The plant has a drainage system formed by two sumps, north and south side, with the possibility to pump into an emergency storage concrete tank of 5100 m3 capacity or directly to the 4760\_70TK1 River Outfall Tank.** |
| **12** | Emissions to water | Reduce emissions to water | Appropriate combination of techniques | Daily Averages directly to receiving waters  Chemical oxygen demand (COD) 25-100 mg/l   Total suspended solids (TSS) 4-50 mg/l   Total nitrogen (TN) 2-20 mg/l   Total phosphorus (TP) 0,2-2 mg/l | Yes | N/A | Separate collection of foul, process and surface waters.  **monitors its emissions to water in regards of the substances released by its process. Matter of monitoring are TSS, COD, BOD, Hydrocarbon Oil Index.**  As detailed below, the proposed limits for V010;   |  |  |  |  |  | | --- | --- | --- | --- | --- | | Release Point | Name | Parameter | Current limit | Proposed limit | | W1 | Emission to Water | Instantaneous flow | 260 | 340 | | 24 hour flow | 4320 | 6240 (260average) | | Temperature | 30 | 35 | | COD | 100 | 130 | | BOD | 20 | 50 |  |  |  |  |  |  | | --- | --- | --- | --- | --- | | Report Type | Release Point | Name | Reporting Period | Monitoring Standard | | Flow | W1 | Emission to Water | Continuous | MCERTS | | Flow | W1 | Emission to Water | Continuous | MCERTS | | COD | W1 | Emission to Water | Daily | ISO 15705 | | COD | W1 | Emission to Water | Daily | ISO 15705 | | BOD | W1 | Emission to Water | Daily | EN 1899-1 | | BOD | W1 | Emission to Water | Daily | EN 1899-1 | | TSS | W1 | Emission to Water | Daily | BS EN 872 | | TSS | W1 | Emission to Water | Daily | BS EN 872 | | OIL | W1 | Emission to Water | Monthly | BS EN ISO 9377-2 | | Temperature | W1 | Emission to Water | Continuous | Verified temperature probe |  |  |  | | --- | --- | | **Technique** | **Applied?** | | Process-integrated techniques | **YES,** Optimising the amount of water used and recycled throughout the  process. | | Recovery of pollutants at source | **YES,** CIP activities and wet washing will be limited to the wet mill and the distillery area. | | Waste water pretreatment | **N/A** | | Final waste water treatment | **YES,** with all waste liquid streams physically collected, equalised and fed to the WWTP. | |
| **13** | Noise | Prevent or, where that is not practicable , to reduce noise emissions | Set up, implement and regularly review a noise management plan as part of the environmental management system (see BAT 1). Should include identified elements. | N/A | TBC | N/A | Risk of noise to sensitive receptors has been screened out as part of Risk Assessment process. Refer to Noise Risk Assessment for further details. Also, due to the site's location and no historic issues with noise complaints from neighbours, noise control measures are deemed to be effective.  However, it should be noted that a further assessment has been requested by the EA at this time. |
| **14** | Noise | Prevent or, where that is not practicable, to reduce noise emissions | Use one or a combination of various techniques | N/A | Yes | N/A | |  |  |  |  | | --- | --- | --- | --- | | Technique | Description | Applicability | Applied | | Optional Measures | These include: —improved inspection and maintenance of equipment — closing of doors and windows of enclosed areas, if possible — equipment operated by experienced staff — avoidance of noisy activities at night, if possible — provisions for noise control  during maintenance activities | Generally applicable | **YES, maintenance contract on going, enclosed areas, equipment doors kept closed.** | | Low-noise equipment | This potentially includes compressors, pumps and disks | Generally applicable when the equipment is new  or replaced | **YES** | | Noise attenuation | Noise propagation can be reduced by inserting obstacles between the emitter and the receiver. Appropriate obstacles include protection walls, embankments and buildings | Generally applicable to new plants. In the case of existing plants, the insertion of obstacles may be restricted by lack of  space | **N/A** | | Noise-control equipment | This includes: — noise- reducers — equipment insulation — enclosure of noisy equipment —  soundproofing of buildings | The applicability may be restricted by lack of space | **YES, main combustion unit fully enclosed in noise proof**  **package.** | | Appropriate location of equipment and buildings | Noise levels can be reduced by increasing the distance between the emitter and the receiver and by using buildings as noise screens | Generally applicable to new plants. In the case of existing plants, the relocation of equipment and  production units may be restricted | **YES, safe distance kept from critical receptors.** | |
| **15** | Odour | Prevent or, where that is not practicable, to reduce odour emissions | Set up, implement and regularly review an odour management plan, as part of the environmental management system (see BAT 1). Should include identified elements. | N/A | Yes | N/A | Sedamyl have an Odour Management Plan. Refer to SED-C3-3b-2 - Odour Management Plan. |
| **BAT conclusions for animal feed** | | | | | | | |
| **16** | Energy Efficiency: Green fodder | To increase energy efficiency in green fodder processing | Combination of the techniques specified in BAT 6 and of various techniques identified. |  |  |  | N/A |
| **17** | Emissions to Air | Reduce channelled dust emissions to air | One of either techniques: bag filter or cyclone. |  |  |  | N/A |
| **BAT conclusions for brewing** | | | | | | | |
| **18** | Energy Efficiency | To increase energy efficiency | Combination of the techniques specified in BAT 6 and of various techniques identified. |  |  |  | N/A |
| **19** | Waste | Reduce the quantity of waste sent for disposal | Use one of both of techniques: recovery and (re)use of yeast after fermentation, recovery and (re)use of natural filter material |  |  |  | N/A |
| **20** | Emissions to Air | Reduce channelled dust emissions to air | Use bag filter or bag filter and cyclone. |  |  |  | N/A |
| **BAT conclusions for dairies** | | | | | | | |
| **21** | Energy Efficiency | Increase energy efficiency | Combination of the techniques specified in BAT 6 and of various techniques identified. |  |  |  | N/A |
| **22** | Waste | reduce the quantity of waste sent for disposal | Use one or combination of various techniques |  |  |  | N/A |
| **23** | Emissions to Air | Reduce channelled dust emissions to air from drying | Use one or combination of various techniques |  |  |  | N/A |
| **BAT conclusions for ethanol production** | | | | | | | |
| **24** | Waste | Reduce the quantity of waste sent for disposal | Recover and (re)use yeast after fermentation |  | Yes | N/A | Yeast is recovered where possible to reduce wastage.  Yeast Propagation recirculationallows the air to be pulled in through the venturi nozzle (a short piece of narrow tube between wider sections for exerting suction). The air will supply the oxygen necessary for the yeast reproduction.  A heat exchanger is located in the recirculation line in order to maintain the ideal temperature for yeast propagation. This is because the breathing reactions produce heat. The exchange happens with water coming from the cooling towers. |
| **BAT conclusions for fish and shellfish processing** | | | | | | | |
| **25** | Water Consumption and waste water discharge | To reduce water consumption and the volume of waste water discharged | Use a combination of techniques specified in BAT 7 and other techniques identified; removal of fat and viscera by vacuum, and dry transport of fat, viscera, skin and fillets. |  |  |  | N/A |
| **26** | Emissions to Air | Reduce channelled emissions of organic compounds to air from fish smoking | Use one or combination of various techniques |  |  |  | N/A |
| **BAT conclusions for the Fruit and Vegetable Sector** | | | | | | | |
| **27** | Energy Efficiency | Increase energy efficiency | use an appropriate combination of the techniques specified in BAT 6 and to cool fruit and vegetables before deep freezing |  |  |  | N/A |
| **BAT conclusions for Grain Milling** | | | | | | | |
| **28** | Emissions to Air | Reduce channelled dust emissions to air | Use of bag filters |  |  |  | LEV - bag filter that draws from wheat intake offloading and transport conveyor system to reduce dust in suspension, the dust is reprocessed back into the product flow. |
| **BAT conclusions for Meat Processing** | | | | | | | |
| **29** | Emissions to Air | Reduce channelled emissions of organic compounds to air from meat smoking | Use one or combination of various techniques |  |  |  | N/A |
| **BAT conclusions for Oilseed Processing and Vegetable Oil Refining** | | | | | | | |
| **30** | Energy Efficiency | Increase energy efficiency | Use an appropriate combination of the techniques specified in BAT 6 and to generate an auxiliary vacuum |  |  |  | N/A |
| **31** | Emissions to Air | Reduce channelled dust emissions to air | One or combination of various techniques: bag filters, cyclone, wet scrubber. |  |  |  | N/A |
| **32** | Hexane losses | Reduce the hexane losses from oilseed processing and refining | Use ALL of the techniques identified: countercurrent flow of meal and steam in the desolventiser-toaster, evaporation from the oil/hexane mixture, condensation in combination with a mineral oil wet scrubber, gravitational phase separation in combination with distillation. |  |  |  | N/A |
| **BAT conclusions for Soft Drinks and Nectar/Juice made from Processed Fruit and Vegetables** | | | | | | | |
| **33** | Energy Efficiency | Increase energy efficiency | Combination of the techniques specified in BAT 6 and other various techniques |  |  |  | N/A |
| **BAT conclusions for Starch Production** | | | | | | | |
| **34** | Emissions to Air | Reduce channelled dust emissions to air from starch, protein and fibre drying. | Use one or a combination of various techniques |  |  |  | N/A |
| **BAT conclusions for Sugar Manufacturing** | | | | | | | |
| **35** | Energy Efficiency | Increase energy efficiency | Combination of the techniques specified in BAT 6 and one or a combination of the other various techniques identified. |  |  |  | N/A |
| **36** | Emissions to Air | Reduce channelled dust emissions to air from beet pulp drying | Use one or combination of various techniques. |  |  |  | N/A |
| **37** | Reduce channelled SOX emissions to air from high-temperature beet pulp drying (above 500 °C) | Reduce channelled SOX emissions to air from high-temperature beet pulp drying (above 500 °C) | Use one or combination of various techniques. |  |  |  | N/A |

# Industrial Cooling Systems

## Reduction of Energy Consumption

## **Table 4.3: BAT for increasing overall energy efficiency:**

Graphical user interface, text

Description automatically generated

Applicable: Once through system has been chosen which is considered BAT. The units on site are induced draft air-coolled systems this is found to be more efficient compared to forced draft cooling towers due to the location of the inlet fans.

## Reduction of Water Requirements

## **Table 4.4: BAT for Reduction of Water Requirements:**

Graphical user interface, application

Description automatically generated

Applicable: Heat reuse is optimised where possible and does not use groundwater.

## Reduction of Entrainment of Organisms

**4.5: BAT for Reduction of Entrainment**

Graphical user interface, application

Description automatically generated

Not applicable: No surface water intake

## Reduction of Emissions to Water

## **Table 4.6: BAT for Reduction of Emissions to Water by Design and Maintenance Techniques:**

Graphical user interface

Description automatically generated

## **Table 4.6 (Continued): BAT for Reduction of Emissions to Water by Design and Maintenance Techniques:**

Graphical user interface

Description automatically generated

Applicable: Stainless Steel tanks and pipework have been installed to reduce risk of corrosivity. The blowdown discharges from the cooling towers enter the site closed drainage system for treatment within the wastewater treatment plant. Water velocities are designed to minimize risk and cleaning takes place on a 6 monthly and annual cleaning and inspection routine.

## Control by Optimised Cooling Water Treatment

## **Table 4.7: BAT for Reduction of Emissions to Water by Optimised Cooling Water Treatment:**

Graphical user interface, application

Description automatically generated

Applicable Cooling towers are on a 6 monthly and annual cleaning and inspection routine, any chemicals used during this time are collected within the bund and removed before the tower is brought back online. Chemicals are dosed to maintain water chemistry; Gengard GN8272: 1800kg, Spectrus OX1201: 1900kg, Spectrus BD1551E: 300kg, Sodium Hypochlorite: 5500kg. See reference documents ‘MSDS - Gengard GN8272 – Suez’ & ‘MSDS - SPECTRUS BD1551E(24652) – Suez’ & ‘MSDS - SPECTRUS OX1201 (2021) – Suez’.

Cleaning chemicals used during cleaning are collected within the bund and removed from site before the tower is brought back online. Each tower is isolated during this process.

## 4.8 – Reduction of Noise Emissions

## 4.8.2 – Identified Reduction Techniques Within the BAT Approach

## **Table 4.9: BAT for the Reduction of Noise Emissions:**

Graphical user interface

Description automatically generated

Applicable: Assessed through Noise Impact Assessment - cooling towers (fans) and 2 pumps 110 kW 1450 RPM. Fans operating 24h; 1 pump operating 24h/day. Expected noise levels:

|  |  |  |
| --- | --- | --- |
| **LAeq** | **LZeq** | **LA95** |
| 89,1 | 90,6 | 87,6 |

As noted previously a further assessment of Noise Levels at the site is to be undertaken by Sedamyl in order to confirm BAT.

# Waste Treatment

## 1.   GENERAL BAT CONCLUSIONS

### 1.1.   Overall environmental performance

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

|  |  |
| --- | --- |
| I. | commitment of the management, including senior management; |

|  |  |
| --- | --- |
| II. | definition, by the management, of an environmental policy that includes the continuous improvement of the environmental performance of the installation; |

|  |  |
| --- | --- |
| III. | planning and establishing the necessary procedures, objectives and targets, in conjunction with financial planning and investment; |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| IV. | implementation of procedures paying particular attention to:   |  |  | | --- | --- | | (a) | structure and responsibility, |  |  |  | | --- | --- | | (b) | recruitment, training, awareness and competence, |  |  |  | | --- | --- | | (c) | communication, |  |  |  | | --- | --- | | (d) | employee involvement, |  |  |  | | --- | --- | | (e) | documentation, |  |  |  | | --- | --- | | (f) | effective process control, |  |  |  | | --- | --- | | (g) | maintenance programmes, |  |  |  | | --- | --- | | (h) | emergency preparedness and response, |  |  |  | | --- | --- | | (i) | safeguarding compliance with environmental legislation; | |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| V. | checking performance and taking corrective action, paying particular attention to:   |  |  | | --- | --- | | (a) | monitoring and measurement (see also the JRC Reference Report on Monitoring of emissions to air and water from IED installations – ROM), |  |  |  | | --- | --- | | (b) | corrective and preventive action, |  |  |  | | --- | --- | | (c) | maintenance of records, |  |  |  | | --- | --- | | (d) | independent (where practicable) internal or external auditing in order to determine whether or not the EMS conforms to planned arrangements and has been properly implemented and maintained; | |

|  |  |
| --- | --- |
| VI. | review, by senior management, of the EMS and its continuing suitability, adequacy and effectiveness; |

|  |  |
| --- | --- |
| VII. | following the development of cleaner technologies; |

|  |  |
| --- | --- |
| VIII. | consideration for the environmental impacts from the eventual decommissioning of the plant at the stage of designing a new plant, and throughout its operating life; |

|  |  |
| --- | --- |
| IX. | application of sectoral benchmarking on a regular basis; |

|  |  |
| --- | --- |
| X. | waste stream management (see BAT 2); |

|  |  |
| --- | --- |
| XI. | an inventory of waste water and waste gas streams (see BAT 3); |

|  |  |
| --- | --- |
| XII. | residues management plan (see description in Section 6.5); |

|  |  |
| --- | --- |
| XIII. | accident management plan (see description in Section 6.5); |

|  |  |
| --- | --- |
| XIV. | odour management plan (see BAT 12); |

|  |  |
| --- | --- |
| XV. | noise and vibration management plan (see BAT 17). |

***Applicability***

The scope (e.g. level of detail) and nature of the EMS (e.g. standardised or non-standardised) will generally be related to the nature, scale and complexity of the installation, and the range of environmental impacts it may have (determined also by the type and amount of wastes processed).

**APPLICABLE. COMPLIANT.**

**SEDAMYL UK Ltd. operates an environmental management system (EMS) certified to ISO 14001:2015 which covers all these points. See attached the ISO 140001 certificate in appendix (A).**

**BAT 2.** In order to improve the overall environmental performance of the plant, BAT is to use all of the techniques given below.

|  |  |  |  |
| --- | --- | --- | --- |
| **Technique** | | **Description** |  |
| a. | Set up and implement waste characterisation and pre-acceptance procedures | These procedures aim to ensure the technical (and legal) suitability of waste treatment operations for a particular waste prior to the arrival of the waste at the plant. They include procedures to collect information about the waste input and may include waste sampling and characterisation to achieve sufficient knowledge of the waste composition. Waste pre-acceptance procedures are risk-based considering, for example, the hazardous properties of the waste, the risks posed by the waste in terms of process safety, occupational safety and environmental impact, as well as the information provided by the previous waste holder(s). | **N/A – as no waste received by site** |
| b. | Set up and implement waste acceptance procedures | Acceptance procedures aim to confirm the characteristics of the waste, as identified in the pre-acceptance stage. These procedures define the elements to be verified upon the arrival of the waste at the plant as well as the waste acceptance and rejection criteria. They may include waste sampling, inspection and analysis. Waste acceptance procedures are risk-based considering, for example, the hazardous properties of the waste, the risks posed by the waste in terms of process safety, occupational safety and environmental impact, as well as the information provided by the previous waste holder(s). | **N/A – as no waste received by site** |
| c. | Set up and implement a waste tracking system and inventory | A waste tracking system and inventory aim to track the location and quantity of waste in the plant. It holds all the information generated during waste pre-acceptance procedures (e.g. date of arrival at the plant and unique reference number of the waste, information on the previous waste holder(s), pre-acceptance and acceptance analysis results, intended treatment route, nature and quantity of the waste held on site including all identified hazards), acceptance, storage, treatment and/or transfer off site. The waste tracking system is risk-based considering, for example, the hazardous properties of the waste, the risks posed by the waste in terms of process safety, occupational safety and environmental impact, as well as the information provided by the previous waste holder(s). | **N/A – as no waste received by site** |
| d. | Set up and implement an output quality management system | This technique involves setting up and implementing an output quality management system, so as to ensure that the output of the waste treatment is in line with the expectations, using for example existing EN standards. This management system also allows the performance of the waste treatment to be monitored and optimised, and for this purpose may include a material flow analysis of relevant components throughout the waste treatment. The use of a material flow analysis is risk-based considering, for example, the hazardous properties of the waste, the risks posed by the waste in terms of process safety, occupational safety and environmental impact, as well as the information provided by the previous waste holder(s). | **N/A – nature of effluent plant will generate consistent waste material** |
| e. | Ensure waste segregation | Waste is kept separated depending on its properties in order to enable easier and environmentally safer storage and treatment. Waste segregation relies on the physical separation of waste and on procedures that identify when and where wastes are stored. | **Waste will be segregated in a roll-on-roll-off skip** |
| f. | Ensure waste compatibility prior to mixing or blending of waste | Compatibility is ensured by a set of verification measures and tests in order to detect any unwanted and/or potentially dangerous chemical reactions between wastes (e.g. polymerisation, gas evolution, exothermal reaction, decomposition, crystallisation, precipitation) when mixing, blending or carrying out other treatment operations. The compatibility tests are risk-based considering, for example, the hazardous properties of the waste, the risks posed by the waste in terms of process safety, occupational safety and environmental impact, as well as the information provided by the previous waste holder(s). | **N/A – no blending of waste to take place** |
| g. | Sort incoming solid waste | Sorting of incoming solid waste[(10)](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2018.208.01.0038.01.ENG&toc=OJ%3AL%3A2018%3A208%3ATOC#ntr10-L_2018208EN.01003901-E0010) aims to prevent unwanted material from entering subsequent waste treatment process(es). It may include:   |  |  | | --- | --- | | — | manual separation by means of visual examinations; |  |  |  | | --- | --- | | — | ferrous metals, non-ferrous metals or all-metals separation; |  |  |  | | --- | --- | | — | optical separation, e.g. by near-infrared spectroscopy or X-ray systems; |  |  |  | | --- | --- | | — | density separation, e.g. by air classification, sink-float tanks, vibration tables; |  |  |  | | --- | --- | | — | size separation by screening/sieving. | | **N/A – as no waste received by site** |

**BAT 3.** In order to facilitate the reduction of emissions to water and air, BAT is to establish and to maintain an inventory of waste water and waste gas streams, as part of the environmental management system (see BAT 1), that incorporates all of the following features:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| (i) | information about the characteristics of the waste to be treated and the waste treatment processes, including:   |  |  | | --- | --- | | (a) | simplified process flow sheets that show the origin of the emissions; |  |  |  | | --- | --- | | (b) | descriptions of process-integrated techniques and waste water/waste gas treatment at source including their performances; | |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| (ii) | information about the characteristics of the waste water streams, such as:   |  |  | | --- | --- | | (a) | average values and variability of flow, pH, temperature, and conductivity; |  |  |  | | --- | --- | | (b) | average concentration and load values of relevant substances and their variability (e.g. COD/TOC, nitrogen species, phosphorus, metals, priority substances/micropollutants); |  |  |  | | --- | --- | | (c) | data on bioeliminability (e.g. BOD, BOD to COD ratio, Zahn-Wellens test, biological inhibition potential (e.g. inhibition of activated sludge)) (see BAT 52); | |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| (iii) | information about the characteristics of the waste gas streams, such as:   |  |  | | --- | --- | | (a) | average values and variability of flow and temperature; |  |  |  | | --- | --- | | (b) | average concentration and load values of relevant substances and their variability (e.g. organic compounds, POPs such as PCBs); |  |  |  | | --- | --- | | (c) | flammability, lower and higher explosive limits, reactivity; |  |  |  | | --- | --- | | (d) | presence of other substances that may affect the waste gas treatment system or plant safety (e.g. oxygen, nitrogen, water vapour, dust). | |

***Applicability***

The scope (e.g. level of detail) and nature of the inventory will generally be related to the nature, scale and complexity of the installation, and the range of environmental impacts it may have (determined also by the type and amount of wastes processed).

**APPLICABLE.COMPLIANT. Complete data collection on production processes, waste water streams and waste biogas stream. This data is recorded from a series of continuous monitoring, regular sampling and spot tests and recorded in a series of spreadsheets to track compliance which can be made available on request.**

**BAT 4.** In order to reduce the environmental risk associated with the storage of waste, BAT is to use all of the techniques given below.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Technique** | | **Description** | **Applicability** |  |
| a. | Optimised storage location | This includes techniques such as:   |  |  | | --- | --- | | — | the storage is located as far as technically and economically possible from sensitive receptors, watercourses, etc.; |  |  |  | | --- | --- | | — | the storage is located in such a way so as to eliminate or minimise the unnecessary handling of wastes within the plant (e.g. the same wastes are handled twice or more or the transport distances on site are unnecessarily long). | | Generally applicable to new plants. | **Storage is located as far from nearby receptors as possible given the location of the plant. The dewatering section is placed and bounded by a canopy that will enclose and segregate the dewatering process, protecting it from the weather and reducing its impact on the surrounding.** |
| b. | Adequate storage capacity | Measures are taken to avoid accumulation of waste, such as:   |  |  | | --- | --- | | — | the maximum waste storage capacity is clearly established and not exceeded taking into account the characteristics of the wastes (e.g. regarding the risk of fire) and the treatment capacity; |  |  |  | | --- | --- | | — | the quantity of waste stored is regularly monitored against the maximum allowed storage capacity; |  |  |  | | --- | --- | | — | the maximum residence time of waste is clearly established. | | Generally applicable. | **The forecast is to have 30 kilos per hour, 720 kilos per day, 5 tonnes per week of excess dry sludge from our Membrane Bio-Reactor plant.**  **This will be stored in a in a 20/30-yard roll-in roll-out skip and removed from site weekly** |
| c. | Safe storage operation | This includes measures such as:   |  |  | | --- | --- | | — | equipment used for loading, unloading and storing waste is clearly documented and labelled; |  |  |  | | --- | --- | | — | wastes known to be sensitive to heat, light, air, water, etc. are protected from such ambient conditions; |  |  |  | | --- | --- | | — | containers and drums are fit for purpose and stored securely. | | **Manged under the site’s HSE Management system** |
| d. | Separate area for storage and handling of packaged hazardous waste | When relevant, a dedicated area is used for storage and handling of packaged hazardous waste. | N/A |

**BAT 5.** In order to reduce the environmental risk associated with the handling and transfer of waste, BAT is to set up and implement handling and transfer procedures.

***Description***

Handling and transfer procedures aim to ensure that wastes are safely handled and transferred to the respective storage or treatment. They include the following elements:

|  |  |
| --- | --- |
| — | handling and transfer of waste are carried out by competent staff; |

|  |  |
| --- | --- |
| — | handling and transfer of waste are duly documented, validated prior to execution and verified after execution; |

|  |  |
| --- | --- |
| — | measures are taken to prevent, detect and mitigate spills; |

|  |  |
| --- | --- |
| — | operation and design precautions are taken when mixing or blending wastes (e.g. vacuuming dusty/powdery wastes). |

Handling and transfer procedures are risk-based considering the likelihood of accidents and incidents and their environmental impact.

**APPLICABLE: COMPLIANT. waste management will be conducted as per the ISO 14001 certified management system and waste transfer will only occur with authorised contractors removing and replacing the skip in place.**

### 1.2.   Monitoring

**BAT 6.** For relevant emissions to water as identified by the inventory of waste water streams (see BAT 3), BAT is to monitor key process parameters (e.g. waste water flow, pH, temperature, conductivity, BOD) at key locations (e.g. at the inlet and/or outlet of the pretreatment, at the inlet to the final treatment, at the point where the emission leaves the installation).

**APPLICABLE.COMPLIANT. Complete data collection on production processes, waste water streams and waste biogas stream. This data is recorded from a series of continuous monitoring, regular sampling and spot tests and recorded in a series of spreadsheets to track compliance which can be made available on request. Permitted monitoring locations will remain the same from previous operation of the ETP.**

**BAT 7.** BAT is to monitor emissions to water with at least the frequency given below, and in accordance with EN standards. If EN standards are not available, BAT is to use ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality.

| **Substance/parameter** | **Standard(s)** | **Waste treatment process** | **Minimum monitoring frequency**[**(11)**](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2018.208.01.0038.01.ENG&toc=OJ%3AL%3A2018%3A208%3ATOC#ntr11-L_2018208EN.01003901-E0011)[**(12)**](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2018.208.01.0038.01.ENG&toc=OJ%3AL%3A2018%3A208%3ATOC#ntr12-L_2018208EN.01003901-E0012) | **Monitoring associated with** |
| --- | --- | --- | --- | --- |
| Adsorbable organically bound halogens (AOX)[(13)](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2018.208.01.0038.01.ENG&toc=OJ%3AL%3A2018%3A208%3ATOC#ntr13-L_2018208EN.01003901-E0013) [(14)](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2018.208.01.0038.01.ENG&toc=OJ%3AL%3A2018%3A208%3ATOC#ntr14-L_2018208EN.01003901-E0014) | EN ISO 9562 | Treatment of water-based liquid waste | Once every day | BAT 20 |
| Benzene, toluene, ethylbenzene, xylene (BTEX)[(13)](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2018.208.01.0038.01.ENG&toc=OJ%3AL%3A2018%3A208%3ATOC#ntr13-L_2018208EN.01003901-E0013) [(14)](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2018.208.01.0038.01.ENG&toc=OJ%3AL%3A2018%3A208%3ATOC#ntr14-L_2018208EN.01003901-E0014) | EN ISO 15680 | Treatment of water-based liquid waste | Once every month |
| Chemical oxygen demand (COD)[(15)](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2018.208.01.0038.01.ENG&toc=OJ%3AL%3A2018%3A208%3ATOC#ntr15-L_2018208EN.01003901-E0015) [(16)](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2018.208.01.0038.01.ENG&toc=OJ%3AL%3A2018%3A208%3ATOC#ntr16-L_2018208EN.01003901-E0016) | No EN standard available | All waste treatments except treatment of water-based liquid waste | Once every month |
| Treatment of water-based liquid waste | Once every day |
| Free cyanide (CN-)[(13)](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2018.208.01.0038.01.ENG&toc=OJ%3AL%3A2018%3A208%3ATOC#ntr13-L_2018208EN.01003901-E0013) [(14)](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2018.208.01.0038.01.ENG&toc=OJ%3AL%3A2018%3A208%3ATOC#ntr14-L_2018208EN.01003901-E0014) | Various EN standards available (i.e. EN ISO 14403-1 and -2) | Treatment of water-based liquid waste | Once every day |
| Hydrocarbon oil index (HOI)[(14)](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2018.208.01.0038.01.ENG&toc=OJ%3AL%3A2018%3A208%3ATOC#ntr14-L_2018208EN.01003901-E0014) | EN ISO 9377-2 | Mechanical treatment in shredders of metal waste | Once every month |
| Treatment of WEEE containing VFCs and/or VHCs |
| Re-refining of waste oil |
| Physico-chemical treatment of waste with calorific value |
| Water washing of excavated contaminated soil |
| Treatment of water-based liquid waste | Once every day |
| Arsenic (As), Cadmium (Cd), Chromium (Cr), Copper (Cu), Nickel (Ni), Lead (Pb), Zinc (Zn)[(13)](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2018.208.01.0038.01.ENG&toc=OJ%3AL%3A2018%3A208%3ATOC#ntr13-L_2018208EN.01003901-E0013) [(14)](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2018.208.01.0038.01.ENG&toc=OJ%3AL%3A2018%3A208%3ATOC#ntr14-L_2018208EN.01003901-E0014) | Various EN standards available (e.g. EN ISO 11885, EN ISO 17294-2, EN ISO 15586) | Mechanical treatment in shredders of metal waste | Once every month |
| Treatment of WEEE containing VFCs and/or VHCs |
| Mechanical biological treatment of waste |
| Re-refining of waste oil |
| Physico-chemical treatment of waste with calorific value |
| Physico-chemical treatment of solid and/or pasty waste |
| Regeneration of spent solvents |
| Water washing of excavated contaminated soil |
| Treatment of water-based liquid waste | Once every day |
| Manganese (Mn)[(13)](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2018.208.01.0038.01.ENG&toc=OJ%3AL%3A2018%3A208%3ATOC#ntr13-L_2018208EN.01003901-E0013) [(14)](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2018.208.01.0038.01.ENG&toc=OJ%3AL%3A2018%3A208%3ATOC#ntr14-L_2018208EN.01003901-E0014) | Treatment of water-based liquid waste | Once every day |
| Hexavalent chromium (Cr(VI))[(13)](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2018.208.01.0038.01.ENG&toc=OJ%3AL%3A2018%3A208%3ATOC#ntr13-L_2018208EN.01003901-E0013) [(14)](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2018.208.01.0038.01.ENG&toc=OJ%3AL%3A2018%3A208%3ATOC#ntr14-L_2018208EN.01003901-E0014) | Various EN standards available (i.e. EN ISO 10304-3, EN ISO 23913) | Treatment of water-based liquid waste | Once every day |
| Mercury (Hg)[(13)](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2018.208.01.0038.01.ENG&toc=OJ%3AL%3A2018%3A208%3ATOC#ntr13-L_2018208EN.01003901-E0013) [(14)](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2018.208.01.0038.01.ENG&toc=OJ%3AL%3A2018%3A208%3ATOC#ntr14-L_2018208EN.01003901-E0014) | Various EN standards available (i.e. EN ISO 17852, EN ISO 12846) | Mechanical treatment in shredders of metal waste | Once every month |
| Treatment of WEEE containing VFCs and/or VHCs |
| Mechanical biological treatment of waste |
| Re-refining of waste oil |
| Physico-chemical treatment of waste with calorific value |
| Physico-chemical treatment of solid and/or pasty waste |
| Regeneration of spent solvents |
| Water washing of excavated contaminated soil |
| Treatment of water-based liquid waste | Once every day |
| PFOA[(13)](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2018.208.01.0038.01.ENG&toc=OJ%3AL%3A2018%3A208%3ATOC#ntr13-L_2018208EN.01003901-E0013) | No EN standard available | All waste treatments | Once every six months |
| PFOS[(13)](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2018.208.01.0038.01.ENG&toc=OJ%3AL%3A2018%3A208%3ATOC#ntr13-L_2018208EN.01003901-E0013) |
| Phenol index[(16)](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2018.208.01.0038.01.ENG&toc=OJ%3AL%3A2018%3A208%3ATOC#ntr16-L_2018208EN.01003901-E0016) | EN ISO 14402 | Re-refining of waste oil | Once every month |
| Physico-chemical treatment of waste with calorific value |
| Treatment of water-based liquid waste | Once every day |
| Total nitrogen (Total N)[(16)](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2018.208.01.0038.01.ENG&toc=OJ%3AL%3A2018%3A208%3ATOC#ntr16-L_2018208EN.01003901-E0016) | EN 12260, EN ISO 11905-1 | Biological treatment of waste | Once every month |
| Re-refining of waste oil |
| Treatment of water-based liquid waste | Once every day |
| Total organic carbon (TOC)[(15)](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2018.208.01.0038.01.ENG&toc=OJ%3AL%3A2018%3A208%3ATOC#ntr15-L_2018208EN.01003901-E0015) [(16)](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2018.208.01.0038.01.ENG&toc=OJ%3AL%3A2018%3A208%3ATOC#ntr16-L_2018208EN.01003901-E0016) | EN 1484 | All waste treatments except treatment of water-based liquid waste | Once every month |
| Treatment of water-based liquid waste | Once every day |
| Total phosphorus (Total P)[(16)](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2018.208.01.0038.01.ENG&toc=OJ%3AL%3A2018%3A208%3ATOC#ntr16-L_2018208EN.01003901-E0016) | Various EN standards available (i.e. EN ISO 15681-1 and -2, EN ISO 6878, EN ISO 11885) | Biological treatment of waste | Once every month |
| Treatment of water-based liquid waste | Once every day |
| Total suspended solids (TSS)[(16)](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2018.208.01.0038.01.ENG&toc=OJ%3AL%3A2018%3A208%3ATOC#ntr16-L_2018208EN.01003901-E0016) | EN 872 | All waste treatments except treatment of water-based liquid waste | Once every month |
| Treatment of water-based liquid waste | Once every day |

**APPLICABLE. COMPLIANT. It should be noted that Nitrogen, Phosphorous, Halogens, Metals or toxic bacteria are not added during the process, therefore the facility does not generate any additional emissions above the background within the water supply.**

**BAT 8.** BAT is to monitor channelled emissions to air with at least the frequency given below, and in accordance with EN standards. If EN standards are not available, BAT is to use ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Substance/Parameter** | **Standard(s)** | **Waste treatment process** | **Minimum monitoring frequency**[**(17)**](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2018.208.01.0038.01.ENG&toc=OJ%3AL%3A2018%3A208%3ATOC#ntr17-L_2018208EN.01003901-E0017) | **Monitoring associated with** |
| Brominated flame retardants[(18)](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2018.208.01.0038.01.ENG&toc=OJ%3AL%3A2018%3A208%3ATOC#ntr18-L_2018208EN.01003901-E0018) | No EN standard available | Mechanical treatment in shredders of metal waste | Once every year | BAT 25 |
| CFCs | No EN standard available | Treatment of WEEE containing VFCs and/or VHCs | Once every six months | BAT 29 |
| Dioxin-like PCBs | EN 1948-1, -2, and -4[(19)](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2018.208.01.0038.01.ENG&toc=OJ%3AL%3A2018%3A208%3ATOC#ntr19-L_2018208EN.01003901-E0019) | Mechanical treatment in shredders of metal waste[(18)](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2018.208.01.0038.01.ENG&toc=OJ%3AL%3A2018%3A208%3ATOC#ntr18-L_2018208EN.01003901-E0018) | Once every year | BAT 25 |
| Decontamination of equipment containing PCBs | Once every three months | BAT 51 |
| Dust | EN 13284-1 | Mechanical treatment of waste | Once every six months | BAT 25 |
| Mechanical biological treatment of waste | BAT 34 |
| Physico-chemical treatment of solid and/or pasty waste | BAT 41 |
| Thermal treatment of spent activated carbon, waste catalysts and excavated contaminated soil | BAT 49 |
| Water washing of excavated contaminated soil | BAT 50 |
| HCl | EN 1911 | Thermal treatment of spent activated carbon, waste catalysts and excavated contaminated soil[(18)](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2018.208.01.0038.01.ENG&toc=OJ%3AL%3A2018%3A208%3ATOC#ntr18-L_2018208EN.01003901-E0018) | Once every six months | BAT 49 |
| Treatment of water-based liquid waste[(18)](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2018.208.01.0038.01.ENG&toc=OJ%3AL%3A2018%3A208%3ATOC#ntr18-L_2018208EN.01003901-E0018) | BAT 53 |
| HF | No EN standard available | Thermal treatment of spent activated carbon, waste catalysts and excavated contaminated soil[(18)](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2018.208.01.0038.01.ENG&toc=OJ%3AL%3A2018%3A208%3ATOC#ntr18-L_2018208EN.01003901-E0018) | Once every six months | BAT 49 |
| Hg | EN 13211 | Treatment of WEEE containing mercury | Once every three months | BAT 32 |
| H2S | No EN standard available | Biological treatment of waste[(20)](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2018.208.01.0038.01.ENG&toc=OJ%3AL%3A2018%3A208%3ATOC#ntr20-L_2018208EN.01003901-E0020) | Once every six months | BAT 34 |
| Metals and metalloids except mercury  (e.g. As, Cd, Co, Cr, Cu, Mn, Ni, Pb, Sb, Se, Tl, V)[(18)](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2018.208.01.0038.01.ENG&toc=OJ%3AL%3A2018%3A208%3ATOC#ntr18-L_2018208EN.01003901-E0018) | EN 14385 | Mechanical treatment in shredders of metal waste | Once every year | BAT 25 |
| NH3 | No EN standard available | Biological treatment of waste[(20)](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2018.208.01.0038.01.ENG&toc=OJ%3AL%3A2018%3A208%3ATOC#ntr20-L_2018208EN.01003901-E0020) | Once every six months | BAT 34 |
| Physico-chemical treatment of solid and/or pasty waste[(18)](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2018.208.01.0038.01.ENG&toc=OJ%3AL%3A2018%3A208%3ATOC#ntr18-L_2018208EN.01003901-E0018) | Once every six months | BAT 41 |
| Treatment of water-based liquid waste[(18)](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2018.208.01.0038.01.ENG&toc=OJ%3AL%3A2018%3A208%3ATOC#ntr18-L_2018208EN.01003901-E0018) | BAT 53 |
| Odour concentration | EN 13725 | Biological treatment of waste[(21)](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2018.208.01.0038.01.ENG&toc=OJ%3AL%3A2018%3A208%3ATOC#ntr21-L_2018208EN.01003901-E0021) | Once every six months | BAT 34 |
| PCDD/F[(18)](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2018.208.01.0038.01.ENG&toc=OJ%3AL%3A2018%3A208%3ATOC#ntr18-L_2018208EN.01003901-E0018) | EN 1948-1, -2 and -3[(19)](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2018.208.01.0038.01.ENG&toc=OJ%3AL%3A2018%3A208%3ATOC#ntr19-L_2018208EN.01003901-E0019) | Mechanical treatment in shredders of metal waste | Once every year | BAT 25 |
| TVOC | EN 12619 | Mechanical treatment in shredders of metal waste | Once every six months | BAT 25 |
| Treatment of WEEE containing VFCs and/or VHCs | Once every six months | BAT 29 |
| Mechanical treatment of waste with calorific value[(18)](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2018.208.01.0038.01.ENG&toc=OJ%3AL%3A2018%3A208%3ATOC#ntr18-L_2018208EN.01003901-E0018) | Once every six months | BAT 31 |
| Mechanical biological treatment of waste | Once every six months | BAT 34 |
| Physico-chemical treatment of solid and/or pasty waste[(18)](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2018.208.01.0038.01.ENG&toc=OJ%3AL%3A2018%3A208%3ATOC#ntr18-L_2018208EN.01003901-E0018) | Once every six months | BAT 41 |
| Re-refining of waste oil | BAT 44 |
| Physico-chemical treatment of waste with calorific value | BAT 45 |
| Regeneration of spent solvents | BAT 47 |
| Thermal treatment of spent activated carbon, waste catalysts and excavated contaminated soil | BAT 49 |
| Water washing of excavated contaminated soil | BAT 50 |
| Treatment of water-based liquid waste[(18)](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2018.208.01.0038.01.ENG&toc=OJ%3AL%3A2018%3A208%3ATOC#ntr18-L_2018208EN.01003901-E0018) | BAT 53 |
| Decontamination of equipment containing PCBs[(22)](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2018.208.01.0038.01.ENG&toc=OJ%3AL%3A2018%3A208%3ATOC#ntr22-L_2018208EN.01003901-E0022) | Once every three months | BAT 51 |

**Not Applicable: No channelled emissions to air**

**BAT 9.** BAT is to monitor diffuse emissions of organic compounds to air from the regeneration of spent solvents, the decontamination of equipment containing POPs with solvents, and the physico-chemical treatment of solvents for the recovery of their calorific value, at least once per year using one or a combination of the techniques given below.

|  |  |  |
| --- | --- | --- |
| **Technique** | | **Description** |
| a | Measurement | Sniffing methods, optical gas imaging, solar occultation flux or differential absorption. See descriptions in Section 6.2. |
| b | Emissions factors | Calculation of emissions based on emissions factors, periodically validated (e.g. once every two years) by measurements. |
| c | Mass balance | Calculation of diffuse emissions using a mass balance considering the solvent input, channelled emissions to air, emissions to water, the solvent in the process output, and process (e.g. distillation) residues. |

**Not Applicable: No spent solvents will be present in waste treatment activities.**

**BAT 10.** BAT is to periodically monitor odour emissions.

***Description***

Odour emissions can be monitored using:

|  |  |
| --- | --- |
| — | EN standards (e.g. dynamic olfactometry according to EN 13725 in order to determine the odour concentration or EN 16841-1 or -2 in order to determine the odour exposure); |

|  |  |
| --- | --- |
| — | when applying alternative methods for which no EN standards are available (e.g. estimation of odour impact), ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality. |

The monitoring frequency is determined in the odour management plan (see BAT 12).

***Applicability***

The applicability is restricted to cases where an odour nuisance at sensitive receptors is expected and/or has been substantiated.

**APPLICABLE. COMPLIANT. Sedamyl carries out periodical Sniff testing at the relevant receptors in order to monitor odour emissions. The monitoring plan is part of the EMS through its procedure “SED EWI-008 Internal odour and noise monitoring”. Records are kept with the usage of forms suggested by the M4 Odour Management.**

**BAT 11.** BAT is to monitor the annual consumption of water, energy and raw materials as well as the annual generation of residues and waste water, with a frequency of at least once per year.

***Description***

Monitoring includes direct measurements, calculation or recording, e.g. using suitable meters or invoices. The monitoring is broken down at the most appropriate level (e.g. at process or plant/installation level) and considers any significant changes in the plant/installation.

**APPLICABLE. COMPLIANT. Ongoing monitoring takes place across the plant for water and energy use, waste water and solid wastes produced on site.**

### 1.3.   Emissions to air

**BAT 12.** In order to prevent or, where that is not practicable, to reduce odour emissions, BAT is to set up, implement and regularly review an odour management plan, as part of the environmental management system (see BAT 1), that includes all of the following elements:

|  |  |
| --- | --- |
| — | a protocol containing actions and timelines; |

|  |  |
| --- | --- |
| — | a protocol for conducting odour monitoring as set out in BAT 10; |

|  |  |
| --- | --- |
| — | a protocol for response to identified odour incidents, e.g. complaints; |

|  |  |
| --- | --- |
| — | an odour prevention and reduction programme designed to identify the source(s); to characterise the contributions of the sources; and to implement prevention and/or reduction measures. |

***Applicability***

The applicability is restricted to cases where an odour nuisance at sensitive receptors is expected and/or has been substantiated.

**APPLICABLE. COMPLIANT. Sedamyl carries out periodical Sniff testing at the relevant receptors in order to monitor odour emissions. The monitoring plan is part of the EMS through its procedure “SED EWI-008 Internal odour and noise monitoring”. Records are kept with the usage of forms suggested by the M4 Odour Management.**

**BAT 13.** In order to prevent or, where that is not practicable, to reduce odour emissions, BAT is to use one or a combination of the techniques given below.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Technique** | | **Description** | **Applicability** |  |
| 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. | Only applicable to open systems. | **Skip containing sludge waste to be collected weekly** |
| 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). | Not applicable if it may hamper the desired output quality. | **N/A** |
| 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. |   In the case of aerobic treatment of waste other than water-based liquid waste, see BAT 36. | Generally applicable. | **N/A** |

**BAT 14.** In order to prevent or, where that is not practicable, to reduce diffuse emissions to air, in particular of dust, organic compounds and odour, BAT is to use an appropriate combination of the techniques given below.

Depending on the risk posed by the waste in terms of diffuse emissions to air, BAT 14d is especially relevant.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Technique** | | **Description** | **Applicability** |  |
| a. | Minimising the number of potential diffuse emission sources | This includes techniques such as:   |  |  | | --- | --- | | — | appropriate design of piping layout (e.g. minimising pipe run 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. | | Generally applicable. | **The forecast is to have 30 kilos per hour, 720 kilos per day, 5 tonnes per week of excess dry sludge from our Membrane Bio-Reactor plant.**  **This will be stored in a in a 20/30-yard roll-in roll-out skip and removed from site weekly** |
| 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, e.g. when degassing WEEE containing VFCs and/or VHCs. | | Applicability may be restricted in the case of existing plants due to operability requirements. | The new system is fitted with high-integrity gaskets for crucial application that cannot be isolate or drained easily.  pumps/compressors/agitators fitted with single mechanical seals. |
| 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. | | Generally applicable. | **Compliant, new update to plant will include corrosion resistant materials.** |
| 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. | | The use of enclosed equipment or buildings may be restricted by safety considerations such as the risk of explosion or oxygen depletion.  The use of enclosed equipment or buildings may also be constrained by the volume of waste. | **The dewatering section is placed and bounded by a canopy that will enclose and segregate the dewatering process, protecting it from the weather and reducing its impact on the surrounding** |
| e. | Dampening | Dampening potential sources of diffuse dust emissions (e.g. waste storage, traffic areas, and open handling processes) with water or fog. | Generally applicable. | **N/A dust emissions are not expected to be an issue** |
| f. | Maintenance | This includes techniques such as:   |  |  | | --- | --- | | — | ensuring access to potentially leaky equipment; |  |  |  | | --- | --- | | — | regularly controlling protective equipment such as lamellar curtains, fast-action doors. | | Generally applicable. | **APPLICABLE. COMPLIANT. The system is covered by regular maintenance schedule, readiness of spare parts for emergency situations and repair, ability for temporary storage.** |
| 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. | Generally applicable. | **APPLICABLE. COMPLIANT. The system is covered by regular maintenance schedule, readiness of spare parts for emergency situations and repair, ability for temporary storage.** |
| h. | Leak detection and repair (LDAR) programme | See Section 6.2. 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. | Generally applicable. | **N/A organic compounds are not expected to be an issue due to the small nature of the storage and equipment storage.** |

**BAT 15.** BAT is to use flaring only for safety reasons or for non-routine operating conditions (e.g. start-ups, shutdowns) by using both of the techniques given below.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Technique** | | **Description** | **Applicability** |  |
| a. | Correct plant design | This includes the provision of a gas recovery system with sufficient capacity and the use of high-integrity relief valves. | Generally applicable to new plants.  A gas recovery system may be retrofitted in existing plants. | **APPLICABLE. COMPLIANT. The waste gas sources are fully enclosed. The Biogas of the Waste Water Treatment Plant is then flared. Fermentation waste gases are collected being an anaerobic reaction, so the system is fully enclosed and gases sent to treatment.**  **It is proposed to recover this carbon dioxide, liquify it and store it for sale. To achieve this, a new carbon dioxide capture and storage plant will be constructed.** |
| b. | Plant management | This includes balancing the gas system and using advanced process control. | Generally applicable. | **APPLICABLE. COMPLIANT. The waste gas sources are fully enclosed. The Biogas of the Waste Water Treatment Plant is then flared. Fermentation waste gases are collected being an anaerobic reaction, so the system is fully enclosed and gases sent to treatment.**  **It is proposed to recover this carbon dioxide, liquify it and store it for sale. To achieve this, a new carbon dioxide capture and storage plant will be constructed.** |

**BAT 16.** In order to reduce emissions to air from flares when flaring is unavoidable, BAT is to use both of the techniques given below.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Technique** | | **Description** | **Applicability** |  |
| a. | Correct design of flaring devices | Optimisation of height and pressure, assistance by steam, air or gas, type of flare tips, etc., to enable smokeless and reliable operation and to ensure the efficient combustion of excess gases. | Generally applicable to new flares. In existing plants, applicability may be restricted, e.g. due to maintenance time availability. |  |
| b. | Monitoring and recording as part of flare management | This includes continuous monitoring of the quantity of gas sent to flaring. It may include estimations of other parameters (e.g. composition of gas flow, heat content, ratio of assistance, velocity, purge gas flow rate, pollutant emissions (e.g. NOX, CO, hydrocarbons), noise). The recording of flaring events usually includes the duration and number of events and allows for the quantification of emissions and the potential prevention of future flaring events. | Generally applicable. |  |

**NOT APPLICABLE: Following discussion with Local Environment Agency Compliance officers, it is currently not efficient to feed back into gas recovery system due to the low volume of gas created, its location within the facility and the processing energy required to make it suitable for the turbines.**

### 1.4.   Noise and vibrations

**BAT 17.** In order to prevent or, where that is not practicable, to reduce noise and vibration emissions, BAT is to set up, implement and regularly review a noise and vibration management plan, as part of the environmental management system (see BAT 1), that includes all of the following elements:

|  |  |
| --- | --- |
| I. | a protocol containing appropriate actions and timelines; |

|  |  |
| --- | --- |
| II. | a protocol for conducting noise and vibration monitoring; |

|  |  |
| --- | --- |
| III. | a protocol for response to identified noise and vibration events, e.g. complaints; |

|  |  |
| --- | --- |
| IV. | a noise and vibration reduction programme designed to identify the source(s), to measure/estimate noise and vibration exposure, to characterise the contributions of the sources and to implement prevention and/or reduction measures. |

***Applicability***

The applicability is restricted to cases where a noise or vibration nuisance at sensitive receptors is expected and/or has been substantiated.

**APPLICABLE: COMPLIANT. Sedamyl within its EMS certified ISO 14001 manages noise prevention, monitoring, response. A system is so implemented to follow up and keep track of action plans agreed.**

**BAT 18.** In order to prevent or, where that is not practicable, to reduce noise and vibration emissions, BAT is to use one or a combination of the techniques given below.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Technique** | | **Description** | **Applicability** |  |
| 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 building exits or entrances. | For existing plants, the relocation of equipment and building exits or entrances may be restricted by a lack of space or excessive costs. | **YES, in the project phase the layout of plant is set taking in consideration the noise issue as well.** |
| b. | Operational measures | This includes techniques such as:   |  |  | | --- | --- | | (i) | 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 during maintenance, traffic, handling and treatment activities. | | Generally applicable. | **YES, periodical maintenance in place.** |
| c. | Low-noise equipment | This may include direct drive motors, compressors, pumps and flares. | **YES, low noise motors are preferred.** |
| d. | Noise and vibration control equipment | This includes techniques such as:   |  |  | | --- | --- | | (i) | noise reducers; |  |  |  | | --- | --- | | (ii) | acoustic and vibrational insulation of equipment; |  |  |  | | --- | --- | | (iii) | enclosure of noisy equipment; |  |  |  | | --- | --- | | (iv) | soundproofing of buildings. | | Applicability may be restricted by a lack of space (for existing plants). | **YES, noise screens or noise attenuation enclosure are installed on site on critical equipment.** |
| e. | Noise attenuation | Noise propagation can be reduced by inserting obstacles between emitters and receivers (e.g. protection walls, embankments and buildings). | Applicable only to existing plants, as the design of new plants should make this technique unnecessary. For existing plants, the insertion of obstacles may be restricted by a lack of space.  For mechanical treatment in shredders of metal wastes, it is applicable within the constraints associated with the risk of deflagration in shredders. | **YES, the location is surrounded with**  **embankments on south east side.** |

### 1.5.   Emissions to water

**BAT 19.** In order 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, BAT is to use an appropriate combination of the techniques given below.

|  |  |  |  |
| --- | --- | --- | --- |
| **Technique** | | **Description** | **Applicability** |
| 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). | | Generally applicable. |
| 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). | Generally applicable. |
| 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. | Generally applicable. |
| d. | Techniques to reduce the likelihood and impact of overflows and failures from tanks and vessels | 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; |  |  |  | | --- | --- | | — | 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). | | Generally applicable. |
| 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. | Applicability may be constrained when high volumes of waste are stored or treated (e.g. mechanical treatment in shredders of metal waste). |
| 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. | Generally applicable to new plants.  Generally applicable to existing plants within the constraints associated with the layout of the water collection system. |
| 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, occasional spillages, etc. and, depending on the pollutant content, recirculated or sent for further treatment. | Generally applicable to new plants.  Generally applicable to existing plants within the constraints associated with the layout of the water drainage system. |
| 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. | The use of above-ground components is generally applicable to new plants. It may be limited however by the risk of freezing.  The installation of secondary containment may be limited in the case of existing plants. |
| 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). | Generally applicable to new plants.  For existing plants, applicability may be limited by space availability and by the layout of the water collection system. |

**APPLICABLE: COMPLIANT. The Aerobic Digestion it is an activated sludge treatment process that generate new biomass throughout its operation and this needs to be purged continuously/periodically to preserve the condition to operate correctly the MBR plant.**

**The amount of sludge produced will depend upon the influent COD content to the aerobic reactor, set by the removal efficiency that the anaerobic reactor will have as previous step of treatment.**

**The forecast is to have 30 kilos per hour, 720 kilos per day, 5 tonnes per week of excess dry sludge from our Membrane Bio-Reactor plant.**

**This will be purged in a 20 cubic meter st/st Buffer Tank and dewatered in a centrifuge decanter until reaching 20% wt dry substance.**

**Along with the centrifuge there will be a polyelectrolytes preparation unit, to provide and mix the flocculant with the biomass and enhance the dewatering process at its maximum capacity.**

**This will shrink considerably the amount the water in the biosolids stream and so the waste to be disposed off-site.**

**Under the decanter will be two screw conveyors collecting the under-flow (UF), one of which able to pivot and distribute the solid stream in a 20/30-yard roll-in roll-out skip.**

**The stream of biosolids at 20% wt dry substance will be around 25 tonnes per week, allowing for a weekly skip switch and off-site disposal by an external specialized company.**

**The over-flow (OF) of the centrifuge is collected into a buffer tank and recirculated in the aerobic tank.**

**The dewatering section is placed and bounded by a canopy that will enclose and segregate the dewatering process, protecting it from the weather and reducing its impact on the surrounding.**

**BAT 20.** In order to reduce emissions to water, BAT is to treat waste water using an appropriate combination of the techniques given below.

|  |  |  |  |
| --- | --- | --- | --- |
| **Technique** | **Typical Pollutants Abated** | **Applicability** | **Applied?** |
| ***Preliminary and primary treatment*** | | | |
| Equalisation | All pollutants | Generally applicable. | **YES** |
| Neutralisation | Acids, alkalis | **YES** |
| Physical separation, e.g. screens, sieves, grit separators, grease separators or primary settlement  tanks | Suspended solids, oil/grease | **YES** |
| ***Biological treatment (secondary treatment), e.g.*** | | | |
| Activated sludge process | Biodegradable organic compounds | Generally applicable. | **YES** |
| Membrane bioreactor | **YES** |

### 1.6.   Emissions from accidents and incidents

**BAT 21.** In order to prevent or limit the environmental consequences of accidents and incidents, BAT is to use all of the techniques given below, as part of the accident management plan (see BAT 1).

|  |  |  |
| --- | --- | --- |
| **Technique** | | **Description** |
| 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. | |
| 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. |
| 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. | |

**APPLICABLE: COMPLIANT. Site is operated 24/7 365 and includes security and extensive monitoring through control room linked to monitoring equipment. Incidents and accidents are controlled through the ISO 14001 certified management system.**

### 1.7.   Material efficiency

**BAT 22.** In order to use materials efficiently, BAT is to substitute materials with waste.

***Description***

Waste is used instead of other materials for the treatment of wastes (e.g. waste alkalis or waste acids are used for pH adjustment, fly ashes are used as binders).

***Applicability***

Some applicability limitations derive from the risk of contamination posed by the presence of impurities (e.g. heavy metals, POPs, salts, pathogens) in the waste that substitutes other materials. Another limitation is the compatibility of the waste substituting other materials with the waste input (see BAT 2).

**COMPLIANT: The Aerobic Digestion it is an activated sludge treatment process that generate new biomass throughout its operation and this needs to be purged continuously/periodically to preserve the condition to operate correctly the MBR plant.**

**The amount of sludge produced will depend upon the influent COD content to the aerobic reactor, set by the removal efficiency that the anaerobic reactor will have as previous step of treatment.**

**The forecast is to have 30 kilos per hour, 720 kilos per day, 5 tonnes per week of excess dry sludge from our Membrane Bio-Reactor plant.**

**This will be purged in a 20 cubic meter st/st Buffer Tank and dewatered in a centrifuge decanter until reaching 20% wt dry substance.**

**Along with the centrifuge there will be a polyelectrolytes preparation unit, to provide and mix the flocculant with the biomass and enhance the dewatering process at its maximum capacity.**

**This will shrink considerably the amount the water in the biosolids stream and so the waste to be disposed off-site.**

**Under the decanter will be two screw conveyors collecting the under-flow (UF), one of which able to pivot and distribute the solid stream in a 20/30-yard roll-in roll-out skip.**

**The stream of biosolids at 20% wt dry substance will be around 25 tonnes per week, allowing for a weekly skip switch and off-site disposal by an external specialized company.**

**The over-flow (OF) of the centrifuge is collected into a buffer tank and recirculated in the aerobic tank.**

**The dewatering section is placed and bounded by a canopy that will enclose and segregate the dewatering process, protecting it from the weather and reducing its impact on the surrounding.**

### 1.8.   Energy efficiency

**BAT 23.** In order to use energy efficiently, BAT is to use both of the techniques given below.

|  |  |  |
| --- | --- | --- |
| **Technique** | | **Description** |
| a. | Energy efficiency plan | An energy efficiency plan entails defining and calculating the specific energy consumption of the activity (or activities), setting key performance indicators on an annual basis (for example, specific energy consumption expressed in kWh/tonne of waste processed) and planning periodic improvement targets and related actions. The plan is adapted to the specificities of the waste treatment in terms of process(es) carried out, waste stream(s) treated, etc. |
| b. | 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. |

**APPLICABLE: COMPLIANT. An energy efficiency plan makes up part of Sedamyl's ISO 14001 certified EMS. The site monitor, measure and record electricity and gas consumption. The energy consumption data is utilised to inform annual energy objectives and targets which are reviewed by the site's Senior Management Team.**

### 1.9.   Reuse of packaging

**BAT 24.** In order to reduce the quantity of waste sent for disposal, BAT is to maximise the reuse of packaging, as part of the residues management plan (see BAT 1).

***Description***

Packaging (drums, containers, IBCs, pallets, etc.) is reused for containing waste, when it is in good condition and sufficiently clean, depending on a compatibility check between the substances contained (in consecutive uses). If necessary, packaging is sent for appropriate treatment prior to reuse (e.g. reconditioning, cleaning).

**NOT APPLICABLE: no packaging will be used for waste management at the WWTP.**

## 3. BAT CONCLUSIONS FOR THE BIOLOGICAL TREATMENT OF WASTE

Unless otherwise stated, the BAT conclusions presented in Section 3 apply to the biological treatment of waste, and in addition to the general BAT conclusions in Section 1. The BAT conclusions in Section 3 do not apply to the treatment of water-based liquid waste.

### 3.1. General BAT conclusions for the biological treatment of waste

**3.1.1. Overall environmental performance**

**BAT 33.** In order to reduce odour emissions and to improve the overall environmental performance, BAT is to select the waste input.

***Description***

The technique consists of carrying out the pre-acceptance, acceptance and sorting of the waste input (see BAT 2) so as to ensure the suitability of the waste input for the waste treatment, e.g. in terms of nutrient balance, moisture or toxic compounds which may reduce the biological activity.

**N/A – as no waste received by site**

### 3.1.2.   Emissions to air

**BAT 34.** In order to reduce channelled emissions to air of dust, organic compounds and odorous compounds, including H2S and NH3, BAT is to use one or a combination of the techniques given below.

|  |  |  |
| --- | --- | --- |
| **Technique** | | **Description** |
| a. | Adsorption | See Section 6.1. |
| b. | Biofilter | See Section 6.1.  A pretreatment of the waste gas before the biofilter (e.g. with a water or acid scrubber) may be needed in the case of a high NH3 content (e.g. 5-40 mg/Nm3) in order to control the media pH and to limit the formation of N2O in the biofilter.  Some other odorous compounds (e.g. mercaptans, H2S) can cause acidification of the biofilter media and necessitate the use of a water or alkaline scrubber for pretreatment of the waste gas before the biofilter. |
| c. | Fabric filter | See Section 6.1. The fabric filter is used in the case of mechanical biological treatment of waste. |
| d. | Thermal oxidation | See Section 6.1. |
| e. | Wet scrubbing | See Section 6.1. Water, acid or alkaline scrubbers are used in combination with a biofilter, thermal oxidation or adsorption on activated carbon. |

N/A – as no channelled emissions to air

### 3.1.3.   Emissions to water and water usage

**BAT 35.** In order to reduce the generation of waste water and to reduce water usage, BAT is to use all of the techniques given below.

|  |  |  |  |
| --- | --- | --- | --- |
| **Technique** | | **Description** | **Applicability** |
| a. | Segregation of water streams | Leachate seeping from compost piles and windrows is segregated from surface run-off water (see BAT 19f). | Generally applicable to new plants.  Generally applicable to existing plants within the constraints associated with the layout of the water circuits. |
| b. | Water recirculation | Recirculating process water streams (e.g. from dewatering of liquid digestate in anaerobic processes) or using as much as possible other water streams (e.g. water condensate, rinsing water, surface run-off water). The degree of recirculation is limited by the water balance of the plant, the content of impurities (e.g. heavy metals, salts, pathogens, odorous compounds) and/or the characteristics of the water streams (e.g. nutrient content). | Generally applicable. |
| c. | Minimisation of the generation of leachate | Optimising the moisture content of the waste in order to minimise the generation of leachate. | Generally applicable. |

**COMPLIANT: The Aerobic Digestion it is an activated sludge treatment process that generate new biomass throughout its operation and this needs to be purged continuously/periodically to preserve the condition to operate correctly the MBR plant.**

**The amount of sludge produced will depend upon the influent COD content to the aerobic reactor, set by the removal efficiency that the anaerobic reactor will have as previous step of treatment.**

**The forecast is to have 30 kilos per hour, 720 kilos per day, 5 tonnes per week of excess dry sludge from our Membrane Bio-Reactor plant.**

**This will be purged in a 20 cubic meter st/st Buffer Tank and dewatered in a centrifuge decanter until reaching 20% wt dry substance.**

**Along with the centrifuge there will be a polyelectrolytes preparation unit, to provide and mix the flocculant with the biomass and enhance the dewatering process at its maximum capacity.**

**This will shrink considerably the amount the water in the biosolids stream and so the waste to be disposed off-site.**

**Under the decanter will be two screw conveyors collecting the under-flow (UF), one of which able to pivot and distribute the solid stream in a 20/30-yard roll-in roll-out skip.**

**The stream of biosolids at 20% wt dry substance will be around 25 tonnes per week, allowing for a weekly skip switch and off-site disposal by an external specialized company.**

**The over-flow (OF) of the centrifuge is collected into a buffer tank and recirculated in the aerobic tank.**

**The dewatering section is placed and bounded by a canopy that will enclose and segregate the dewatering process, protecting it from the weather and reducing its impact on the surrounding.**

## 3.2.   BAT conclusions for the aerobic treatment of waste

Unless otherwise stated, the BAT conclusions presented in this section apply to the aerobic treatment of waste, and in addition to the general BAT conclusions for the biological treatment of waste in Section 3.1.

### 3.2.1.   Overall environmental performance

**BAT 36.** In order to reduce emissions to air and to improve the overall environmental performance, BAT is to monitor and/or control the key waste and process parameters.

***Description***

Monitoring and/or control of key waste and process parameters, including:

|  |  |
| --- | --- |
| — | waste input characteristics (e.g. C to N ratio, particle size); |

|  |  |
| --- | --- |
| — | temperature and moisture content at different points in the windrow; |

|  |  |
| --- | --- |
| — | aeration of the windrow (e.g. via the windrow turning frequency, O2 and/or CO2 concentration in the windrow, temperature of air streams in the case of forced aeration); |

|  |  |
| --- | --- |
| — | windrow porosity, height and width. |

***Applicability***

Monitoring of the moisture content in the windrow is not applicable to enclosed processes when health and/or safety issues have been identified. In that case, the moisture content can be monitored before loading the waste into the enclosed composting stage and adjusted when it exits the enclosed composting stage.

**Not applicable for WWTP upgrade. The Wastewater Treatment Plant Upgrade will involve the construction of an additional Membrane Bio-reactor (MBR) plant formed by the Aerobic Tank 4765\_10TK1 and the UF (tank already in place but being raised for an increase capacity), a Sludge Dewatering plant formed by a decanter centrifuge, polyelectrolytes make down unit and sludge container and the shifting of 4762\_30TK1 RO3 from UASB reactor to Acidification / Equalization tank. For a visual differentiation in between the old and new sections please refer to SED C3-3a-20.**

**3.2.2.   Odour and diffuse emissions to air**

**BAT 37.** In order to reduce diffuse emissions to air of dust, odour and bioaerosols from open-air treatment steps, BAT is to use one or both of the techniques given below.

|  |  |  |  |
| --- | --- | --- | --- |
| **Technique** | | **Description** | **Applicability** |
| a. | Use of semipermeable membrane covers | Active composting windrows are covered by semipermeable membranes. | Generally applicable. |
| b. | Adaptation of operations to the meteorological conditions | This includes techniques such as the following:   |  |  | | --- | --- | | — | Taking into account weather conditions and forecasts when undertaking major outdoor process activities. For instance, avoiding formation or turning of windrows or piles, screening or shredding in the case of adverse meteorological conditions in terms of emissions dispersion (e.g. the wind speed is too low or too high, or the wind blows in the direction of sensitive receptors). |  |  |  | | --- | --- | | — | Orientating windrows, so that the smallest possible area of composting mass is exposed to the prevailing wind, to reduce the dispersion of pollutants from the windrow surface. The windrows and piles are preferably located at the lowest elevation within the overall site layout. | | Generally applicable. |

**Not applicable for WWTP upgrade. The Wastewater Treatment Plant Upgrade will involve the construction of an additional Membrane Bio-reactor (MBR) plant formed by the Aerobic Tank 4765\_10TK1 and the UF (tank already in place but being raised for an increase capacity), a Sludge Dewatering plant formed by a decanter centrifuge, polyelectrolytes make down unit and sludge container and the shifting of 4762\_30TK1 RO3 from UASB reactor to Acidification / Equalization tank. For a visual differentiation in between the old and new sections please refer to SED C3-3a-20.**

**The dewatering section is placed and bounded by a canopy that will enclose and segregate the dewatering process, protecting it from the weather and reducing its impact on the surrounding.**

## 3.3.   BAT conclusions for the anaerobic treatment of waste

Unless otherwise stated, the BAT conclusions presented in this section apply to the anaerobic treatment of waste, and in addition to the general BAT conclusions for the biological treatment of waste in Section 3.1.

### 3.3.1.   Emissions to air

**BAT 38.** In order to reduce emissions to air and to improve the overall environmental performance, BAT is to monitor and/or control the key waste and process parameters.

***Description***

Implementation of a manual and/or automatic monitoring system to:

|  |  |
| --- | --- |
| — | ensure a stable digester operation; |

|  |  |
| --- | --- |
| — | minimise operational difficulties, such as foaming, which may lead to odour emissions; |

|  |  |
| --- | --- |
| — | provide sufficient early warning of system failures which may lead to a loss of containment and explosions. |

This includes monitoring and/or control of key waste and process parameters, e.g.:

|  |  |
| --- | --- |
| — | pH and alkalinity of the digester feed; |

|  |  |
| --- | --- |
| — | digester operating temperature; |

|  |  |
| --- | --- |
| — | hydraulic and organic loading rates of the digester feed; |

|  |  |
| --- | --- |
| — | concentration of volatile fatty acids (VFA) and ammonia within the digester and digestate; |

|  |  |
| --- | --- |
| — | biogas quantity, composition (e.g. H2S) and pressure; |

|  |  |
| --- | --- |
| — | liquid and foam levels in the digester. |

**APPLICABLE. COMPLIANT. Operation of the WWTP is controlled via remote monitoring and automatic dosing and circulation of waste through the system. Continuous Sampling and automated monitoring at outlet with daily laboratory samples collected and analysed in compliance with site permitted requirements.**

## 3.4.   BAT conclusions for the mechanical biological treatment (MBT) of waste

Unless otherwise stated, the BAT conclusions presented in this section apply to MBT, and in addition to the general BAT conclusions for the biological treatment of waste in Section 3.1.

The BAT conclusions for the aerobic treatment (Section 3.2) and anaerobic treatment (Section 3.3) of waste apply, when relevant, to the mechanical biological treatment of waste.

### 3.4.1.   Emissions to air

**BAT 39.** In order to reduce emissions to air, BAT is to use both of the techniques given below.

|  |  |  |  |
| --- | --- | --- | --- |
| **Technique** | | **Description** | **Applicability** |
| a. | Segregation of the waste gas streams | Splitting of the total waste gas stream into waste gas streams with a high pollutant content and waste gas streams with a low pollutant content, as identified in the inventory mentioned in BAT 3. | Generally applicable to new plants.  Generally applicable to existing plants within the constraints associated with the layout of the air circuits. |
| b. | Recirculation of waste gas | Recirculation of waste gas with a low pollutant content in the biological process followed by waste gas treatment adapted to the concentration of pollutants (see BAT 34).  The use of waste gas in the biological process may be limited by the waste gas temperature and/or the pollutant content.  It may be necessary to condense the water vapour contained in the waste gas before reuse. In this case, cooling is necessary, and the condensed water is recirculated when possible (see BAT 35) or treated before discharge. |

**APPLICABLE. COMPLIANT. Waste gas is burnt with a flare system, currently not efficient to feed back into combustion systems, due to the low volume of gas created, its location within the facility and the processing energy required to make it suitable for the turbines.**

**Waste gases from fermentation tanks processed by wet scrubbing and periodical monitoring of the emission source as set by Environmental Permit.**

**The waste gas sources are fully enclosed. The Biogas of the Waste Water Treatment Plant is then flared. Fermentation waste gases are collected being an anaerobic reaction, so the system is fully enclosed and gases sent to treatment.**

**It is proposed to recover this carbon dioxide, liquify it and store it for sale. To achieve this, a new carbon dioxide capture and storage plant will be constructed.**