Industrial Emissions Licensing

Section 90(1)(aa) Review Form and Guidance Note

for the activities covered by the Commission Implementing Decision (2013/732/EU) where it relates to the main activity of an installation.

This form is for the purpose of enabling the Agency to complete a mandatory review of an Industrial Emissions licence or revised licence under Section 90(1)(aa) of the EPA Act 1992 as amended

(i.e. a questionnaire for the purposes of completing the review).

Ref: Commission Implementing Decision (2013/732/EU) establishing the best available techniques (BAT) conclusions under Directive 2010/75/EU on industrial emissions for the production of Chlor-alkali.

EPA Reg. №:	

Environmental Protection Agency

P.O. Box 3000, Johnstown Castle Estate, Co. Wexford

Lo Call: 1890 335599 Telephone: 053-9160600 Fax: 053-9160699

Web: www.epa.ie Email: Industrial_Emissions_Licensing_Queries@epa.ie

Tracking Amendments to Review Form

Version No.	Date	Amendment since previous version	Reason
V1.0	25/01/2017	N/A	Section 90(l)(aa) of the EPA Act 1992 as amended

CONTENTS

ABOUT THIS REVIEW FORM

This form is for the purpose of a review of a licence or revised licence relating to an industrial emissions directive activity in order to ensure that necessary documents, particulars and other information are provided by the licensee so that the Agency can:

a. assess compliance with the Industrial Emissions Directive (including baseline report requirements, waste management etc.),

b. assess compliance with the Commission Implementing Decision of 09 December 2013 establishing the best available techniques (BAT) conclusions under Directive 2010/75/EU of the European Parliament and of the Council on industrial emissions for the production of chlor-alkali (2013/732/EU),

c. have regard to any change in environmental quality in the area of the installation (Section 90(6)),

d. have regard to any emerging techniques in particular those emerging techniques identified in the BAT reference documents (Section 90(6)),

e. compare the operation of the installation, including an assessment of the results of environmental monitoring, with the BAT described in the applicable BAT conclusions and with the emissions levels associated with the BAT (Section 90(8)),

f. facilitate public participation in the licence review process by providing information about the activity and where it is situated,

g. ensure any variations or adjustments to the licence agreed by the Office of Environmental Enforcement are considered, and

h. ensure coherence with planning and development requirements.

The completed Review Form and all supporting information should be submitted to the Headquarters of the Agency via an electronic 'BATC Review' web-form available on EDEN.

To enable the Agency to expedite the licence review process, licensees are requested to submit the completed review form and all supporting information no later than the date specified in the Section 90(7) Notice.

All pages, including maps/drawings/plans, should be no larger than A3 size. All attachments should be submitted in searchable PDF format and be no larger than 10MB each in size. Supporting information is to be uploaded as an attachment in the BATC Review web-form.
You are directed to:

a. Complete all steps of the BATC Review web-form, accessed via EDEN

b. Upload this completed Review Form as an attachment to the BATC Review web-form at the placeholder for the BATC Review Form.

c. Upload additional attachments to the relevant placeholder in the BATC Review web-form, where available, and

d. Upload any other attachment as an 'additional attachment' in the BATC Review web-form

10MB is the maximum allowable document size for uploading.

SECTION A: GENERAL

A.1. Licensee and location of licensed installation

Existing Licence Register Number:	P0082-02

Name of licensee*:	Micro-Bio (Ireland) Limited
Address of installation:	Fermoy Industrial Estate
	Fermoy
	County Cork
Tel:	(025) 31388
Fax:	025 32458
e-mail:	dobrien@micro-bio.ie

* This should be the name of the licensee which is current on the date this Review Form is lodged with the Agency. It should be the name of the legal entity (which can be a limited company and has a CRO number and or a sole trader) that holds the licence. A trading/business name is **not** **acceptable**.

National Grid Reference (12 digit 6E,6N)	180579E, 099391N

CRO No. and address of registered or principal office of Body Corporate

CRO No.	48005
Address of company:	FERMOY INDUSTRIAL ESTATE
	FERMOY
	CO CORK
Tel:	(025) 31388
Fax:	025 32458
e-mail:	dobrien@micro-bio.ie

Name and Address for Correspondence
Only documentation submitted by the licensee and by the nominated person will be deemed to have come from the licensee.

Name:	Denis O' Brien
Address:	FERMOY INDUSTRIAL ESTATE
	FERMOY
	CO CORK
Tel:	(025) 31388
Fax:	025 32458
e-mail:	dobrien@micro-bio.ie

A.3. Class of Activity

Input, as authorised in the existing licence, the relevant activities from the First Schedule of the EPA Act 1992 as amended, authorised at the installation:

Class	Description
5.13 (b)	The production of inorganic chemicals, such as acids, such as chromic acid, hydrofluoric acid, phosphoric acid, nitric acid, hydrochloric acid, sulphuric acid, oleum, sulphurous acids (production means the production on an industrial scale by chemical or biological processing)
5.13 (c)	The production of inorganic chemicals, such as bases, such as ammonium hydroxide, potassium hydroxide, sodium hydroxide (production means the production on an industrial scale by chemical or biological processing)

A.3A Classes of Waste Activity

If a Class 11 activity is listed in your response to A.3, identify the relevant activities as listed in Annex I and Annex II of the Waste Framework Directive (2008/98/EC) by completing table A.3A below.

TABLE A.3A Classes of Waste Activity

Waste Framework Directive 2008/98/EC

Annex I Disposal Operations		Y/N
D 1	Deposit into or on to land (e.g. including landfill, etc.).	
D 2	Land treatment (e.g. biodegradation of liquid or sludgy discards in soils, etc.).	
D 3	Deep injection (e.g. injection of pumpable discards into wells, salt domes or naturally occurring repositories, etc.).	
D 4	Surface impoundment (e.g. placement of liquid or sludgy discards into pits, ponds or lagoons, etc.).	
D 5	Specially engineered landfill (e.g. placement into lined discrete cells which are capped and isolated from one another and the environment, etc.).	
D 6	Release into a water body except seas/oceans.	
D 7	Release to seas/oceans including sea-bed insertion.	
D 8	Biological treatment not specified elsewhere in this Annex which results in final compounds or mixtures which are discarded by means of any of the operations numbered D 1 to D 12.	
D 9	Physico-chemical treatment not specified elsewhere in this Annex which results in final compounds or mixtures which are discarded by means of any of the operations numbered D 1 to D 12 (e.g. evaporation, drying, calcinations, etc.).	
D 10	Incineration on land.	
D 11	Incineration at sea.[1]	
D 12	Permanent storage (e.g. emplacement of containers in a mine, etc).	
D 13	Blending or mixing prior to submission to any of the operations numbered D 1 to D 12.[2]	

[1] This operation is prohibited by EU legislation and international conventions.

Annex I Disposal Operations		Y/N
D 14	Repackaging prior to submission to any of the operations numbered D 1 to D 13.	
D 15	Storage pending any of the operations numbered D 1 to D 14 (excluding temporary storage, pending collection, on the site where the waste is produced).[7]	

Annex II Recovery Operations		Y/N
R 1	Use principally as a fuel or other means to generate energy.[3]	
R 2	Solvent reclamation/regeneration.	
R 3	Recycling /reclamation of organic substances which are not used as solvents (including composting and other biological transformation processes).[4]	
R 4	Recycling/reclamation of metals and metal compounds.	
R 5	Recycling/reclamation of other inorganic materials.[5]	
R 6	Regeneration of acids or bases.	
R 7	Recovery of components used for pollution abatement.	
R 8	Recovery of components from catalysts.	
R 9	Oil re-refining or other reuses of oil.	
R 10	Land treatment resulting in benefit to agriculture or ecological improvement.	
R 11	Use of waste obtained from any of the operations numbered R 1 to R 10.	
R 12	Exchange of waste for submission to any of the operations numbered R 1 to R 11.[6]	
R 13	Storage of waste pending any of the operations numbered R 1 to R 12 (excluding temporary storage, pending collection, on the site where the waste is produced).[7]	

A.4 Industrial Emissions Directive

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[2] If there is no other D code appropriate, this can include preliminary operations prior to disposal including pre-processing such as, inter alia, sorting, crushing, compacting, pelletising, drying, shredding, conditioning or separating prior to submission to any of the operations numbered D1 to D12.

[3] This includes incineration facilities dedicated to the processing of municipal solid waste only where their energy efficiency is equal to or above:

- 0.60 for installations in operation and permitted in accordance with applicable Community legislation before 1 January 2009,
- 0.65 for installations permitted after 31 December 2008,

using the following formula:

Energy efficiency = (Ep - (Ef + Ei)/ (0.97x(Ew+Ef)

In which:

'Ep' means annual energy produced as heat or electricity and is calculated with energy in the form of electricity being multiplied by 2.6 and heat produced for commercial use multiplied by 1.1(GJ/year),

'Ef' means annual energy input to the system from fuels contributing to the production of steam (GJ/year),

'Ew' means annual energy contained in the treated waste calculated using the net calorific value of the waste (GJ/year),

'Ei' means annual energy imported excluding Ew and Ef(GJ/year),

'0.97' is a factor accounting for energy losses due to bottom ash and radiation.

This formula shall be applied in accordance with the reference document on Best Available Techniques for waste incineration.

[4] This includes gasification and pyrolisis using the components as chemicals.

[5] This includes soil cleaning resulting in recovery of the soil and recycling of inorganic construction materials.

[6] If there is no other R code appropriate, this can include preliminary operations prior to recovery including pre-processing such as, inter alia, dismantling, sorting, crushing, compacting, pelletising, drying, shredding, conditioning, repackaging, separating, blending or mixing prior to submission to any of the operations numbered R1 to R11.

[7] Temporary storage means preliminary storage according to point (1) of Article 3 [of the Waste Framework Directive 2008/98/EC].

State whether the installation falls under the scope of Chapters III, IV, V or VI of the Industrial Emissions Directive (2010/75/EU).

☐ Yes ☒ No

If yes specify the relevant sections and Annex.

IED Chapter(s) and relevant Annex(es)	**Y/N**	Identify Annexes to the Directive relevant to your licence
Chapter III		
Chapter IV		
Chapter V		
Chapter VI		

A.5. Planning Permission Requirements associated with this review

A.5.1
State whether **development** is required for the purposes of achieving compliance with the Commission Implementing Decision of 9 December 2013 establishing the best available techniques (BAT) conclusions under Directive 2010/75/EU of the European Parliament and of the Council on industrial emissions for the production of Chlor-alkali (2013/732/EU):

☐ Yes ☒ No

A.5.2
If yes to A.5.1, State whether **planning permission** is required for this development:

☐ Yes ☐ No

If no to A.5.2, provide written confirmation as **Attachment Nº. A.5a** from the planning authority or An Bord Pleanála that planning permission is not required for this development.

If yes to A.5.2:

- give details of the planning status relating to the development required for the purposes of achieving compliance with the CID 2013/732/EU:

A.5.(a) has been obtained	
A.5.(b) has been refused	
A.5.(c) is being processed	

Local Authority Name and Planning File Reference Nº:	
An Bord Pleanála Planning File Reference No:	

If yes to A.5.2:

- provide a copy of any report on a screening for Appropriate Assessment and, if prepared, a Natura Impact Statement (NIS) that was prepared for consideration by any planning/public authority as defined in Regulation 2(1) of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011) in relation to the activity. Where a determination that an Appropriate Assessment is required has been made by any planning/public authority in relation to the activity, a copy of that determination and any screening report and Natura Impact Statement (NIS), and any supplemental information furnished in relation to any such report or statement, which has been provided to the planning/public authority for the purposes of the Appropriate Assessment shall be included as **Attachment Nº A.5c.**

A.6 Seveso III Regulations

State whether the activity is an establishment to which the EC (Control of Major Accident Hazards involving Dangerous Substances) Regulations (S.I. No. 209 of 2015) apply.

☐ Yes ☒ No

If yes, outline how the installation comes under these Regulations.
If yes, outline existing or proposed measures, including emergency procedures, to minimise the impact on the environment of an accidental emission or spillage having regard to the Safety Report and/ or Major Accident Prevention Policy as appropriate.

Supporting information should be included in **Attachment Nº A.6**.

A.7 Mercury Regulation

State whether the activity is one to which the following apply:

- European Communities Mercury (Export Ban and Safe Storage) Regulations (S.I. No. 27 of 2012),

- Regulation (EC) No 1102/2008 of the European Parliament and of the Council of 22 October 2008 on the banning of exports or metallic mercury and certain mercury compounds and mixtures and the safe storage of metallic mercury.

☐ Yes ☒ No

If yes, outline in **Attachment Nº A.7** how the activity comes under these Regulations.

A.8 Regulations Controlling Fluorinated Greenhouse Gases and Ozone Depleting Substances

State whether the installation is one to which the following apply:

– Operator of equipment and systems containing ozone depleting substances, in accordance with Regulation (EC) No. 1005/2009 on substances that deplete the ozone layer.

☐ Yes ☒ No

– Operator of equipment and systems containing fluorinated greenhouse gases, in accordance with Regulation (EC) No. 842/2006 on certain fluorinated greenhouse gases.

☐ Yes ☒ No

If yes, outline in **Attachment № A.8** how the activity comes under these regulations.

More information and guidance is available on the EPA website:

http://www.epa.ie/air/airenforcement/ozone/guidanceanddownloads/

A.9 Indicative list of the principal polluting substances

State whether any of the substances specified in the Schedule of the EPA (Industrial Emissions)(Licensing) Regulations 2013, S.I. No. 137 of 2013, are emitted by the activity to air and/or water.

☒ Yes ☐ No

If yes, identify and list the substances and where appropriate the associated emission limit value specified in the licence in **Attachment No A.9.**

A.10 Variations or adjustments to the conditions or schedules of the existing licence agreed by the OEE

For the purposes of consistency, you should provide details of any variations and adjustments to the existing licence conditions or schedules agreed with the Agency since grant of your existing licence. **Attachment № A.10** should include the schedule of variations and/or adjustments (in a format as outlined below) together with updated drawings, where appropriate.

Condition/ Schedule No.	Existing Condition	OEE Agreement Reference	Description

A.11 Once-off assessments and reports under the existing licence

Please provide details of any once-off assessments and/or reports required under the conditions and schedules of the existing licence.

Answer:

The following once off assessments/reports are required under the conditions and schedules of the existing licence:

Condition / Schedule Ref.	Once off assessment/report required
Condition 3.8	Stormwater Risk Assessment Report
Condition 3.9	Firewater Retention Risk Assessment Report
Condition 6.1.5	Test Programme for abatement equipment Report
Condition 10.4	Closure, Restoration and Aftercare Management Plan
Condition 12.3.2	Environmental Liabilities Risk Assessment Report

SECTION B: COMPARISON WITH BAT

B.1 A comparison of the operation of the installation with BAT

You must submit results of emissions monitoring from the preceding twelve months in **Attachment Nº. B.1**. This includes emissions monitoring as specified in the existing licence or any other emissions monitoring carried out by or on behalf of the licensee.

You must evaluate the monitoring results and other data and present your assessment such that it will enable a comparison of the operation of the installation with the best available techniques described in the applicable BAT conclusions and with the emission levels associated with the best available techniques in accordance with Section 86A(9) of the Act of 1992 as amended.

Complete the tables in Annex I as appropriate for this purpose and include in **Attachment Nº. B.1**.

B.2 BAT consideration:

The BAT conclusions from the Commission Implementing Decision of 09 December 2013 establishing the best available techniques (BAT) conclusions under Directive 2010/75/EU of the European Parliament and of the Council on industrial emissions for the production of Chlor-alkali (2013/732/EU) have been prepopulated into the web-form for your use. Each BAT has a free text field and ability to upload a 10 MB attachment for your use. Further guidance on completing the BAT consideration is available on the web-form.

Your assessment of each BATC shall be inputted directly into the **BATC Review web-form fields and where necessary, uploaded in a supporting attachment to the place holder associated with the relevant BATC**.

B.3 Emerging Techniques

State whether you propose to test and use an 'emerging technique' in particular those identified in the BAT reference documents relevant to the activity:

☐ Yes ☒ No

If yes, describe your proposal and include in **as an uploaded attachment to the relevant BATC placeholder in the BATC Review web-form.**

B.4 Other relevant conclusions on BAT

Tabulate, using the format in Table B.4(i) below, all of the relevant conclusions on BAT from the following BREF documents:

- Reference Document on Best Available Techniques for Energy Efficiency, February 2009
- Reference Document on Best Available Techniques on Emissions from Storage, July 2006
- Reference Document on Best Available Techniques for the Waste Treatments Industries, August 2006, in relation to any activities at the installation involving the **acceptance** of

waste for treatment, recovery or disposal. Please note that no analysis of this BREF is necessary in relation to waste generated as a result of licensed activities at the site.

Other relevant Reference Documents on Best Available Techniques for other activities/ processes carried on at the installation.

These documents are available on the European IPPC bureau website at:

http://eippcb.jrc.ec.europa.eu/reference/

For each relevant conclusion on BAT, in Table B.4(i), describe how each BAT applies to your installation and provide information on your compliance with the requirement.

For each applicable BAT, state the status; 'Yes', 'Will be' or 'No' as appropriate; the use of each of these terms is described below. Information on compliance in the 'Applicability Assessment' box should include, where applicable, the following:

(i) Identification of the relevant process/ activity or individual emission points that the BAT requirement applies to at your installation;
(ii) Where BAT is to use one or a combination of listed techniques, specify the technique(s) implemented/proposed at your installation to achieve the BAT; and
(iii) A comment on how the requirements are being met or will be met, e.g., a description of the technology/operational controls/management proposed to meet the requirements.

Use of terms:

(a) 'Yes' – To be selected where the installation is currently complaint with this BAT requirement.

(b) 'Will be' – To be selected where a further technique is required to be installed to achieve compliance with the BAT requirement. In this case you must also give the date, by which the installation will comply with the BAT requirement.

Your assessment shall be **uploaded using the Additional Attachments 'Upload files' button in Step 4 on the BATC Review web-form**.

Other documents which are of relevance for the activities:
(a) REF on Economic and Cross-media Effects;
(b) REF on Monitoring of Emissions from IED installations;

Table B.4 (i) CONCLUSIONS ON BAT

Title of Document			
BAT reference Number	**BAT Statement**	**Applicability Assessment**	**State if in place or state schedule for implementation**
e.g. BAT 1	*BAT is to implement and adhere to an environmental management system (EMS) that incorporates all of the following features:….*	*Applicable*	*Standardised EMS in place*

B.5 Tabular Data on Emission and Monitoring Points

You must submit the following information for each emission and monitoring point and include in **Attachment Nº. B.5**:

Point Code	Point Type	Easting	Northing	Verified	Emission/ monitoring
References assigned in existing licence	A=Atmospheric SW=Surface Water SE = Sewer GW=Groundwater N = Noise SL=Soil/Ground WS=Waste	6E-digit GPS Irish National Grid Reference	6N-digit GPS Irish National Grid Reference	Y = GPS used N = GPS not used	E / M

SECTION C: Waste Prevention and Management

C.1 Waste Prevention

Describe in **Attachment Nº C.1** the arrangements and measures taken for the prevention of waste in accordance with Article 12(1)(h) of the Industrial Emissions Directive.

State whether the installation has participated in any projects under the National Waste Prevention Programme.

☐ Yes ☒ No

If yes, give an outline of the project and its conclusions and include in **Attachment Nº C.1**.

C.2 Recovery or disposal of solid and liquid wastes generated at the installation.

You must complete Table C.2(i) of Annex I for each waste generated at the installation. Where any waste is classified as Hazardous Waste as defined in the Waste Management Act, 1996, as amended, this should be made clear in the information provided.

Supporting information should be included in **Attachment Nº C.2.**

C.3 Waste hierarchy

You must describe in **Attachment Nº C.3** how waste generated by the installation will be in order of priority in accordance with section 21A of the Waste Management Acts 1996 as amended, prepared for re-use, recycling, recovery or where that is not technically or economically possible, disposed of in a manner which will prevent or minimise any impact on the environment.

Section 29(2A) of the Waste Management Acts 1996 to 2013 states that it shall be the duty of waste producers and holders to ensure that waste undergoes recovery operations in accordance with sections 21A and 32(1) of the Acts.

For waste whose generation cannot be prevented, describe what measures will be in place to ensure that waste is collected separately (if technically, environmentally and economically practicable) and will not be mixed with other waste or other material with different properties.

For any waste currently being sent for recovery by incineration (waste-to-energy), provide evidence that it is not technically or economically possible for this waste to be prepared for reuse or recycled.

For any waste currently being sent for disposal by incineration or landfill, provide evidence that it is not technically or economically possible for this waste to be prepared for reuse, recycled or recovered.

SECTION D: EXISTING ENVIRONMENT & IMPACT OF THE ACTIVITY

D.1 Impact of emissions

State whether there has been any change in environmental quality in the area of the installation since the installation was granted a licence or revised licence (Section 90(6) of the EPA Act 1992 as amended).

☐ Yes ☒ No

If yes, identify and describe these changes in **Attachment Nº. D.1a**. In addition, provide an assessment in **Attachment Nº. D.1a** of the effects of any emissions from the installation on the environment of the area where there has been a change in environmental quality.

State whether there has been any change in environmental quality objectives and standards for air[8], surface water[9], groundwater[10] as they relate to the emissions from the installation since the installation was last granted a licence or revised licence.

[8] Air Quality standards Regulations 2011 (S.I. No. 180 of 2011)
[9] European Communities Environmental Objectives (Surface Waters) Regulations, 2009 (S.I. No. 272 of 2009)

☒ Yes ☐ No

If yes, identify and describe these changes in **Attachment Nº. D.1b**. In addition, provide in **Attachment Nº. D.1b** an assessment of the effects of any emissions from the installation on the environment of the area.

State whether the installation has an emission to sewer:

☐ Yes ☒ No

If yes, provide in **Attachment Nº. D.1c** information that will allow the Agency to be satisfied with the requirements of Section 86A(8)(a) and (b) of the EPA Act 1992 as amended:

> **Section 86A(8)**
> *The Agency, in considering an application for a licence or a revised licence, may, where appropriate, take into account the effect of a waste water treatment plant when determining the emission limit values to apply in relation to indirect releases of polluting substances into water from an installation, but the Agency shall not grant a licence or revised licence on that basis unless it is satisfied that –*
>
> *(a) the licence or revised licence, or any conditions attached thereto, shall is guaranteed, and*
>
> *(b) so granting will not lead to higher levels of pollution in the environment.*

D.2 Baseline report

State whether the licensed activity involves the use, production or release of relevant hazardous substances:

☒ Yes ☐ No

If yes, Provide an assessment as to whether a baseline report, in accordance with the requirements of section 86B of the EPA Act 1992 as amended, is required. The assessment should be carried out in accordance with the European Commission guidance referenced below. If it is determined that a baseline report is required, provide a baseline report. The assessment and the baseline report should be **uploaded to the BATC Review web-form at the specified place holder for Baseline assessment/ report.**

European Commission Guidance concerning baseline reports under Article 22(2) of Directive 2010/75/EU on industrial emissions is available here.

http://eur-lex.europa.e u/legal-content/EN/TXT/PDF/?uri=CELEX:52014XC0506(01)&from=EN

[10] European Communities Environmental Objectives (Groundwater) Regulations, 2010 (S.I. No. 9 of 2010)

SECTION E: DECLARATION

Declaration

I certify that the information given in this Review Form is truthful, accurate and complete.

I give consent to the EPA to copy this Review Form for its own use and to make it available for inspection and copying by the public, both in the form of paper files available for inspection at EPA and local authority offices, and via the EPA's website. This consent relates to this review Form itself and to any further information, submission, objection, or submission to an objection whether provided by me as licensee or any person acting on the licensees behalf.

Signed by: Denis O' Brien **Date:** 5/09/2017
(on behalf of the organisation)

Print signature name: DENIS O' BRIEN

Position in organisation: TECHNICAL DIRECTOR

Company stamp or seal:

MICRO-BIO (IRELAND) LTD
Industrial Estate
Fermoy
Co Cork
Ireland
Tel No: +353 25 31388
Vat No: IE9Y09130T

Section 90(1)(aa) Review Form Attachments

for

Micro-Bio (Ireland) Ltd.

Contents

Attachment No. A.9

INDICATIVE LIST OF THE PRINCIPAL POLLUTING SUBSTANCES TO BE TAKEN INTO ACCOUNT BY THE AGENCY FOR THE FIXING OF EMISSION LIMIT VALUES

Air

Principal Polluting Substance	Emission Limit Value mg/m^3
Chlorine	3
Hydrogen Chloride (as HCL)	10

Water

Principal Polluting Substance	Emission Limit Value mg/l
Total Suspended Solids	35
Total Phosphorus	0.5
Chlorine	0.1
TOC	20
Metals (As, Hg, Se, Cr, Cu, Pb, Ni, Ba, B, Zn)	1
Chloride	50,000
Total Dissolved Solids	130,000
VOC's (toluene, xylene, dichloromethane)	1

Attachment No. A.10

Variations and adjustments to the existing licence conditions or schedules agreed with the Agency since grant of the existing lice (Licence Ref. P0082-02)

Condition/ Schedule No.	Existing Condition	OEE Agreement Reference	Description
2	N/A	Section 82A (II) Amendment to Industrial Emissions Licence	Additional conditions inserted at the end of Condition 2 of the licence

Attachment No. B.1

Results of emissions monitoring from the preceding twelve months

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TABLE B.1(i): MAIN EMISSIONS TO ATMOSPHERE – Comparison with BAT (1 table per emission point)

Emission Point Reference Number: ***A2-1***

Parameter	Emission levels associated with BAT (1)		Brief description of treatment	As emitted (1) (2) (3)					
	mg/Nm³			mg/Nm³		kg/h.		kg/year	
	Lower	Upper		Avg	Max	Avg	Max	Avg	Max
Chlorine – 2 x biannual monitoring results were used to establish the average and maximum results	0.2	1.0	Wet Scrubber and Back-up Scrubber System	1.85	1.9	0.001	0.001	5.3	6.3

1. Concentrations should be based on Normal conditions of temperature and pressure, (i.e. 0°C,101.3kPa). Wet/dry should be the same as given in Table E.1(ii) unless clearly stated otherwise.
2. Average concentrations/mass flows shall be based on the arithmetic mean of monitoring results from the preceding twelve months taken under normal operating conditions. The maximum concentration and mass flow shall be based on the monitoring results from the preceding twelve months taken under normal operating conditions.
3. For each parameter identify the frequency of monitoring and the number of monitoring results used to establish the average and maximum results.

Emission Point Reference Number: A2-2

Parameter	Emission levels associated with BAT (1)		Brief description of treatment	As emitted (1) (2) (3)					
	mg/Nm^3			mg/Nm^3		kg/h.		kg/year	
	Lower	Upper		Avg	Max	Avg	Max	Avg	Max
Hydrogen Chloride (as HCL) – 2 x biannual monitoring results were used to establish the average and maximum results	N/S	N/S	Wet Scrubber and Back-up Scrubber System	0.21	0.21	0.0001	0.0001	0.22	0.22

1. Concentrations should be based on Normal conditions of temperature and pressure, (i.e. 0^{o}C,101.3kPa). Wet/dry should be the same as given in Table E.1(ii) unless clearly stated otherwise.
2. Average concentrations/mass flows shall be based on the arithmetic mean of monitoring results from the preceding twelve months taken under normal operating conditions. The maximum concentration and mass flow shall be based on the monitoring results from the preceding twelve months taken under normal operating conditions.
3. For each parameter identify the frequency of monitoring and the number of monitoring results used to establish the average and maximum results.
4. N/S – Not specified in Commission Implementing Decision (2013/732/EU) establishing the best available techniques (BAT) conclusions under Directive 2010/75/EU on industrial emissions for the production of Chlor-alkali.

Emission Point Reference Number: A2-3

Parameter	Emission levels associated with BAT (1)		Brief description of treatment	As emitted (1) (2) (3)					
	mg/Nm^3			mg/Nm^3		kg/h.		kg/year	
	Lower	Upper		Avg	Max	Avg	Max	Avg	Max
Hydrogen Chloride (as HCL) – 2 x biannual monitoring results were used to establish the average and maximum results	N/S	N/S	Wet Scrubber and Back-up Scrubber System	0.36	0.38	0.0001	0.0001	0.33	0.35

1. Concentrations should be based on Normal conditions of temperature and pressure, (i.e. 0^{o}C,101.3kPa). Wet/dry should be the same as given in Table E.1(ii) unless clearly stated otherwise.
2. Average concentrations/mass flows shall be based on the arithmetic mean of monitoring results from the preceding twelve months taken under normal operating conditions. The maximum concentration and mass flow shall be based on the monitoring results from the preceding twelve months taken under normal operating conditions.
3. For each parameter identify the frequency of monitoring and the number of monitoring results used to establish the average and maximum results.
4. N/S – Not specified in Commission Implementing Decision (2013/732/EU) establishing the best available techniques (BAT) conclusions under Directive 2010/75/EU on industrial emissions for the production of Chlor-alkali.

TABLE B.2(i): EMISSIONS TO SURFACE WATERS – Comparison with BAT (1 table per emission point)

Emission point reference number: ***SE1***

Parameter	Emission levels associated with BAT		As discharged (1) (2)					
	lower (mg/l)	upper(mg/l)	Max. hourly average (mg/l)	Max. daily average (mg/l)	kg/day	kg/year	Frequency of Monitoring	Number of monitoring results used to establish average and maximum results
Suspended Solids	N/S	N/S	31.0	31.0	2.31	841.6	Weekly	61
Sulphate	N/S	N/S	1,184	1,184	88.06	32,141	Weekly	62
Total Phosphorus (as P)	N/S	N/S	0.1	0.1	0.01	2.7	Weekly	60
Chlorine	0.05	0.2	0.1	0.1	0.01	2.7	Daily	365
TOC	N/S	N/S	5.7	5.7	0.42	154.7	Monthly	12
Metals (As, Hg, Se, Cr, Cu, Pb, Ni, Ba, B, Zn)	N/S	N/S	0.2	0.2	0.01	5.43	Biannually	2
Chloride	N/S	N/S	49,100	49,100	3,651	1,332,911	Daily	365
Total Dissolved Solids	N/S	N/S	82,700	82,700	6,150	2,245,046	Daily	365
VOC's (toluene, xylene, dichloromethane)	N/S	N/S	0.2	0.2	0.01	5.43	Annually	1

1. Average concentrations and mass flows shall be based on the arithmetic mean of monitoring results from the preceding twelve months taken under normal operating conditions. The maximum concentration and mass flow shall be based on the monitoring results from the preceding twelve months taken under normal operating conditions.

2. For each parameter identify the frequency of monitoring and the number of monitoring results used to establish the average and maximum results.

3. Note: N/S – Not specified in Commission Implementing Decision (2013/732/EU) establishing the best available techniques (BAT) conclusions under Directive 2010/75/EU on industrial emissions for the production of Chlor-alkali.

TABLE B.6(i) : EMISSIONS MONITORING AND SAMPLING POINTS (1 table per monitoring point)

Emission Point Reference No. : A2-1

Parameter	Monitoring frequency	Accessibility of Sampling Points	Sampling method	Analysis method/ technique
Chlorine	Weekly	Accessible	USEPA M26	Ion Chromatography

Emission Point Reference No. : A2-2

Parameter	Monitoring frequency	Accessibility of Sampling Points	Sampling method	Analysis method/ technique
Hydrogen Chloride (as HCL)	Monthly	Accessible	EN1911:2010	Ion Chromatography

Emission Point Reference No. : A2-3

Parameter	Monitoring frequency	Accessibility of Sampling Points	Sampling method	Analysis method/ technique
Hydrogen Chloride (as HCL)	Monthly	Accessible	EN1911:2010	Ion Chromatography

Emission Point Reference No. : SE1

Parameter	Monitoring frequency	Accessibility of Sampling Points	Sampling method	Analysis method/ technique
Flow	Continuous	Accessible	Flow Meter	Electronic
Temperature	Continuous	Accessible	Continuous	Temperature Meter
pH	Continuous	Accessible	Continuous	pH Meter
Suspended Solids	Weekly	Accessible	Sampler	ET 0422 (Based on APHA 2450:B)
Sulphate	Weekly	Accessible	Sampler	ETC981/APHA 1998S
Total Phosphorus (as P)	Weekly	Accessible	Sampler	ET0461/APHA 1998S
Chlorine	Daily	Accessible	Sampler	DPD Colour
TOC	Monthly	Accessible	Sampler	ET1371/APHA1998 5310:B
Metals (As, Hg, Se, Cr, Cu, Pb, Ni, Ba, B, Zn)	Biannually	Accessible	Sampler	APHA 98 3030C:3111:B
Chloride	Daily	Accessible	Sampler	Mohr Titration
Total Dissolved Solids	Daily	Accessible	Sampler	ETC171
VOC's (toluene, xylene, dichloromethane)	Annually	Accessible	Sampler	Gas Chromatography

Attachment No. B.4.

Conclusions on BAT from the Emissions from Storage BAT Reference Document

Conclusions on BAT	Applicability Assessment (describe how the technique applies or not to your installation)	State whether it is in place or state schedule for implementation
5.1 Storage of liquids and Liquefied gases 5.1.1.1 General principles to prevent and reduce emissions		
BAT 1. BAT for a proper design is to take into account at least the following: • the physico-chemical properties of the substance being stored • how the storage is operated, what level of instrumentation is needed, how many operators are required, and what their workload will be • how the operators are informed of deviations from normal process conditions (alarms) • how the storage is protected against deviations from normal process conditions (safety instructions, interlock systems, pressure relief devices, leak detection and containment, etc.) • what equipment has to be installed, largely taking account of past experiences of the product (construction materials, valve quality, etc.) • which maintenance and inspection plan needs to be implemented and how to ease the maintenance and inspection work (access, layout, etc.) • how to deal with emergency situations (distances to other tanks, facilities and to the boundary, fire protection, access for emergency services such as the fire brigade, etc.).	Applicable	Yes-bulk storage tanks have designed and are maintained and monitored in accordance with EPA Guidance on Storage
BAT 2. BAT is to apply a tool to determine proactive maintenance plans and to develop risk-based inspection plans such as the risk and reliability based maintenance approach; see Section 4.1.2.2.1.	Applicable	A PM Programme is in place. Integrity testing is performed.
BAT3.	Applicable	Yes in place. All hazardous material

BAT is to locate a tank operating at, or close to, atmospheric pressure aboveground. However, for storing flammable liquids on a site with restricted space, underground tanks can also be considered. For liquefied gases, underground, mounded storage or spheres can be considered, depending on the storage volume.		tanks are above ground.
BAT 4. BAT is to apply either a tank colour with a reflectivity of thermal or light radiation of at least 70 %, or a solar shield on aboveground tanks which contain volatile substances, see Section 4.1.3.6 and 4.1.3.7 respectively.	Applicable	Yes in place.
BAT 5. BAT is to abate emissions from tank storage, transfer and handling that have a significant negative environmental effect, as described in Section 4.1.3.1	Applicable	Yes -bunding and venting is in place
BAT 6. On sites where significant VOC emissions are to be expected, BAT includes calculating the VOC emissions regularly.	Not Applicable	
BAT 7. BAT is to apply dedicated systems; see Section 4.1.4.4.	Applicable	All systems are dedicated
5.1.1.2 Tank specific considerations		
Open top tanks BAT 8. If emissions to air occur, BAT is to cover the tank by applying: • a floating cover, see Section 4.1.3.2 • a flexible or tent cover, see Section 4.1.3.3, or • a rigid cover, see Section 4.1.3.4. Additionally, with an open top tank covered with a flexible, tent or a rigid cover, a vapour treatment installation can be applied to achieve an additional emission reduction, see Section 4.1.3.15. The type of cover and the necessity for applying the vapour treatment system depend on the substances stored and must be decided on a case-by-case basis.	Applicable	Only open top tanks are in WWTP- no significant emissions
BAT 9.	Applicable to WWTP tanks only	Mixing is performed

To prevent deposition that would call for an additional cleaning step, BAT is to mix the stored substance (e.g. slurry), see Section 4.1.5.1.		
External floating roof tank BAT 10. The BAT associated emission reduction level for a large tank is at least 97 % (compared to a fixed roof tank without measures), which can be achieved when over at least 95 % of the circumference the gap between the roof and the wall is less than 3.2 mm and the seals are liquid mounted, mechanical shoe seals.	Applicable	Apart from vent Tanks are sealed. Where potential emissions occur tanks are vented through scrubbers.
BAT 11. BAT is to apply direct contact floating roofs (double-deck), however, existing non-contact floating roofs (pontoon) are also BAT. See Section 3.1.2. A dome can be BAT for adverse weather conditions, such as high winds, rain or snowfall. See Section 4.1.3.5.	Not Applicable	
BAT 12. For liquids containing a high level of particles (e.g. crude oil), BAT is to mix the stored substance to prevent deposition that would call for an additional cleaning step, see Section 4.1.5.1.	Not Applicable	
Fixed roof tanks BAT 13. For the storage of volatile substances which are toxic (T), very toxic (T+), or carcinogenic, mutagenic and reproductive toxic (CMR) categories 1 and 2 in a fixed roof tank, BAT is to apply a vapour treatment installation.	Not Applicable	
BAT 14. For other substances, BAT is to apply a vapour treatment installation, or to install an internal floating roof (see Sections 4.1.3.15 and 4.1.3.10 respectively). Direct contact floating roofs and non-contact floating roofs are BAT.	Applicable	Vapour treatment in place
BAT 15. For tanks < 50 m^3, BAT is to apply a pressure relief valve set at the highest possible value consistent with the tank design criteria.	Not Applicable	No heating takes place and due to nature of materials stored 38oC flashpoint limit does not apply.
BAT 16.		To WWTP tanks only-mixing

For liquids containing a high level of particles (e.g. crude oil) BAT is to mix the stored substance to prevent deposition that would call for an additional cleaning step, see Section 4.1.5.1.	Applicable	
Atmospheric horizontal tanks BAT 17. For the storage of volatile substances which are toxic (T), very toxic (T+), or CMR categories 1 and 2 in an atmospheric horizontal tank, BAT is to apply a vapour treatment installation.	Not Applicable	
BAT 18. For other substances, BAT is to do all, or a combination, of the following techniques, depending on the substances stored: • apply pressure vacuum relief valves; see Section 4.1.3.11 • up rate to 56 mbar; see Section 4.1.3.11 • apply vapour balancing; see Section 4.1.3.13 • apply a vapour holding tank, see Section 4.1.3.14, or • apply vapour treatment; see Section 4.1.3.15. The selection of the vapour treatment technology has to be decided on a case-by-case basis.	Not Applicable	
Pressurised storage BAT 19. BAT for draining depends on the tank type, but may be the application of a closed drain system connected to a vapour treatment installation, see Section 4.1.4. The selection of the vapour treatment technology has to be decided on a case-by-case basis.	Applicable	This is in place
Lifter roof tanks BAT 20. For emissions to air, BAT is to (see Sections 3.1.9 and 4.1.3.14): • apply a flexible diaphragm tank equipped with pressure/vacuum relief valves, or • apply a lifter roof tank equipped with pressure/vacuum relief valves and connected to a vapour treatment installation.	Not Applicable	

The selection of the vapour treatment technology has to be decided on a case-by-case basis.		
Underground and mounded tanks BAT 21. For the storage of volatile substances which are toxic (T), very toxic (T+), or CMR categories 1 and 2 in an underground or mounded tank, BAT is to apply a vapour treatment installation.	Not Applicable	
BAT 22. For other substances, BAT is to do all, or a combination, of the following techniques, depending on the substances stored: • apply pressure vacuum relief valves; see Section 4.1.3.11 • apply vapour balancing; see Section 4.1.3.13 • apply a vapour holding tank, see Section 4.1.3.14, or • apply vapour treatment; see Section 4.1.3.15. The selection of the vapour treatment technology has to be decided on a case-by-case basis.	Not Applicable	
5.1.1.3 Preventing incidents and (major) accidents		
BAT 23. BAT in preventing incidents and accidents is to apply a safety management system as described in Section 4.1.6.1.	Applicable	SMS complete with Emergency Response Procedures in place
BAT 24. BAT is to implement and follow adequate organisational measures and to enable training and instruction of employees for safe and responsible operation of the installation as described in Section 4.1.6.1.1.	Applicable	Performed through staff instruction, training and review.
BAT 25. BAT is to prevent corrosion by: • selecting construction material that is resistant to the product stored • applying proper construction methods • preventing rainwater or groundwater entering the tank and if necessary, removing water that	Applicable	This is place and systems are reviewed and upgraded where possible

has accumulated in the tank • applying rainwater management to bund drainage • applying preventive maintenance, and • where applicable, adding corrosion inhibitors, or applying cathodic protection on the inside of the tank.		
BAT 26. Additionally for an underground tank, BAT is to apply to the outside of the tank: • a corrosion-resistant coating • plating, and/or • a cathodic protection system.	Applicable	To WWTP tanks only
BAT 27. BAT is to prevent stress corrosion cracking (SCC) by: • stress relieving by post-weld heat treatment, see Section 4.1.6.1.4, and • applying a risk based inspection as described in Section 4.1.2.2.1.	Applicable	This is in place-inspections performed
BAT 28. BAT is to implement and maintain operational procedures – e.g. by means of a management system – as described in Section 4.1.6.1.5, to ensure that: • high level or high pressure instrumentation with alarm settings and/or auto closing of valves is installed • proper operating instructions are applied to prevent overfill during a tank filling operation, and • sufficient ullage is available to receive a batch filling.	Applicable	Tanks are bunded, level gauges fitted and linked to Scada. Allowable levels specified. Permit to Work system in place.
BAT 29. BAT is to apply leak detection on storage tanks containing liquids that can potentially cause soil pollution.	Applicable	Tanks are bunded.
BAT 30. BAT is to achieve a 'negligible risk level' of soil pollution from bottom and bottom-wall connections of aboveground storage tanks. However, on a case-by-case basis, situations might be identified where an 'acceptable risk level' is sufficient.	Applicable	Tanks are bunded.
BAT 31.	Applicable	Storage tanks are bunded,

BAT for aboveground tanks containing flammable liquids or liquids that pose a risk for significant soil pollution or a significant pollution of adjacent watercourses is to provide secondary containment, such as: • tank bunds around single wall tanks; see Section 4.1.6.1.11 • double wall tanks; see Section 4.1.6.1.13 • cup-tanks; see Section 4.1.6.1.14 • double wall tanks with monitored bottom discharge; see Section 4.1.6.1.15.		flammables are stored in double wall tanks
BAT 32. For building new single walled tanks containing liquids that pose a risk for significant soil pollution or a significant pollution of adjacent watercourses, BAT is to apply a full, impervious, barrier in the bund, see Section 4.1.6.1.10.	Applicable	Tanks are bunded, impervious base. Bunds are tested
BAT 33. For existing tanks within a bund, BAT is to apply a risk-based approach, considering the significance of risk from product spillage to the soil, to determine if and which barrier is best applicable. This risk-based approach can also be applied to determine if a partial impervious barrier in a tank bund is sufficient or if the whole bund needs to be equipped with an impervious barrier. See Section 4.1.6.1.11.	Applicable	Tanks are bunded, impervious base. Bunds are tested
BAT 34. For chlorinated hydrocarbon solvents (CHC) in single walled tanks, BAT is to apply CHC-proof laminates to concrete barriers (and containments), based on phenolic or furan resins. One form of epoxy resin is also CHC-proof. See Section 4.1.6.1.12.	Not Applicable	
BAT 35. BAT for underground and mounded tanks containing products that can potentially cause soil pollution is to: • apply a double walled tank with leak detection, see Section 4.1.6.1.16, or • to apply a single walled tank with secondary containment and leak detection, see Section 4.1.6.1.17.	Applicable to WWTP	Tanks are bunded, impervious base. Bunds are tested
BAT 36.	Not Applicable	

For toxic, carcinogenic or other hazardous substances, BAT is to apply full containment.		
5.1.2. Storage of packaged dangerous substances		
BAT 37. BAT in preventing incidents and accidents is to apply a safety management system as described in Sections 4.1.6.1. The minimum level of BAT is to assess the risks of accidents and incidents on the site using the five steps described in Section 4.1.6.1	Applicable	Stored in bunded areas-bunds are tested
BAT 38. BAT is to appoint a person or persons who is or are responsible for the operation of the store.	Applicable	Yard supervisor
BAT 39. BAT is to provide the responsible person(s) with specific training and retraining in emergency procedures as described in Section 4.1.7.1 and to inform other staff on the site of the risks of storing packaged dangerous substances and the precautions necessary to safely store substances that have different hazards.	Applicable	Site wide training provided. ER Team in place
BAT 40. BAT is to apply a storage building and/or an outdoor storage area covered with a roof, as described in Section 4.1.7.2. For storing quantities of less than 2500 litres or kilograms dangerous substances, applying a storage cell as described in Section 4.1.7.2 is also BAT.	Applicable	This is in place
BAT 41. BAT is to separate the storage area or building of packaged dangerous substances from other storage, from ignition sources and from other buildings on- and off-site by applying a sufficient distance, sometimes in combination with fire-resistant walls.	Applicable	This is in place
BAT 42. BAT is to separate and/or segregate incompatible substances. For the compatible and incompatible combinations see Annex 8.3.	Applicable	This is in place

BAT 43. BAT is to install a liquid-tight reservoir according to Section 4.1.7.5, that can contain all or a part of the dangerous liquids stored above such a reservoir. The choice whether all or only a part of the leakage needs to be contained depends on the substances stored and on the location of the storage (e.g. in a water catchment area) and can only be decided on a case-by-case basis.	Applicable	This is in place
BAT 44. BAT is to install a liquid-tight extinguishant collecting provision in storage buildings and storage areas according to Section 4.1.7.5. The collecting capacity depends on the substances stored, the amount of substances stored, the type of package used and the applied fire-fighting system and can only be decided on a case-by-case basis.	Not Applicable	External Storage-non flammable materials
BAT 45. BAT is to apply a suitable protection level of fire prevention and fire-fighting measures as described in Section 4.1.7.6. The appropriate protection level has to be decided on a case-by-case basis in agreement with the local fire brigade.	Applicable	This is in place-local Fire brigade perform site specific training.
BAT 46. BAT is to prevent ignition at source as described in Section 4.1.7.6.1.	Applicable	ATEX areas zoned and identified
5.1.3 Basins and lagoons		
BAT 47. Where emissions to air from normal operation are significant, e.g. with the storage of pig slurry, BAT is to cover basins and lagoons using one of the following options: • a plastic cover; see Section 4.1.8.2 • a floating cover; see Section 4.1.8.1, or • only small basins, a rigid cover; see Section 4.1.8.2. Additionally, where a rigid cover is used, a vapour treatment installation can be applied to achieve an extra emission reduction, see Section 4.1.3.15. The need for and type of vapour treatment must be decided on a case-by-case basis.	Not Applicable	
BAT 48.	Not Applicable	

To prevent overfilling due to rainfall in situations where the basin or lagoon is not covered, BAT is to apply a sufficient freeboard, see Section 4.1.11.1.		
BAT 49. Where substances are stored in a basin or lagoon with a risk of soil contamination, BAT is to apply an impervious barrier. This can be a flexible membrane, a sufficient clay layer or concrete, see Section 4.1.9.1	Not Applicable	
5.2 Transfer and handling of liquids and liquefied gases 5.2.1 General principles to prevent and reduce emissions		
BAT 50. BAT is to apply a tool to determine proactive maintenance plans and to develop risk-based inspection plans such as, the risk and reliability based maintenance approach; see Section 4.1.2.2.1.	Applicable	PM System in place
BAT 51. For large storage facilities, according to the properties of the products stored, BAT is to apply a leak detection and repair programme. Focus needs to be on those situations most likely to cause emissions (such as gas/light liquid, under high pressure and/or temperature duties). See Section 4.2.1.3.	Applicable	PM System in place-inspections for leaks performed.
BAT 52. BAT is to abate emissions from tank storage, transfer and handling that have a significant negative environmental effect, as described in Section 4.1.3.1.	Applicable	These tanks are vented through scrubbers
BAT 53. BAT in preventing incidents and accidents is to apply a safety management system as described in Section 4.1.6.1.	Applicable	This is place and systems are reviewed and upgraded where possible
BAT 54. BAT is to implement and follow adequate organisational measures and to enable the training and instruction of employees for safe and responsible operation of the installation as described in Section 4.1.6.1.1.	Applicable	Performed through staff instruction, training and review.
5.2.2 Considerations on transfer and handling techniques 5.2.2.1 Piping		
BAT 55.		All product lines are overground.

BAT is to apply aboveground closed piping in new situations, see Section 4.2.4.1. For existing underground piping it is BAT to apply a risk and reliability based maintenance approach as described in Section 4.1.2.2.1.	Applicable	For WWTP lines Programme of underground pipeline testing in place
BAT 56. BAT is to minimise the number of flanges by replacing them with welded connections, within the limitation of operational requirements for equipment maintenance or transfer system flexibility, see Section 4.2.2.1.	Applicable	This is in place
BAT 57. BAT for bolted flange connections (see Section 4.2.2.2.) include: • fitting blind flanges to infrequently used fittings to prevent accidental opening • using end caps or plugs on open-ended lines and not valves • ensuring gaskets are selected appropriate to the process application • ensuring the gasket is installed correctly • ensuring the flange joint is assembled and loaded correctly • where toxic, carcinogenic or other hazardous substances are transferred, fitting high integrity gaskets, such as spiral wound, kammprofile or ring joints.	Applicable	This is in place
BAT 58. BAT is to prevent corrosion by: • selecting construction material that is resistant to the product • applying proper construction methods • applying preventive maintenance, and • where applicable, applying an internal coating or adding corrosion inhibitors.	Applicable	This is in place
BAT 59. To prevent the piping from external corrosion, BAT is to apply a one, two, or three layer coating system depending on the site-specific conditions (e.g. close to sea). Coating is normally not applied to plastic or stainless steel pipelines. See Section 4.2.3.2.	Applicable	This is in place
5.2.2.2 Vapour treatment		
BAT 60. BAT is to apply vapour balancing or treatment on significant emissions from the	Applicable	This is in place

loading and unloading of volatile substances to (or from) trucks, barges and ships. The significance of the emission depends on the substance and the volume that is emitted, and has to be decided on a case-by-case basis. For more detail see Section 4.2.8.		
5.2.2.3 Valves		
BAT 61. BAT for valves include: • correct selection of the packing material and construction for the process application • with monitoring, focus on those valves most at risk (such as rising stem control valves in continual operation) • applying rotating control valves or variable speed pumps instead of rising stem control valves • where toxic, carcinogenic or other hazardous substances are involved, fit diaphragm, bellows, or double walled valves • route relief valves back into the transfer or storage system or to a vapour treatment system.	Applicable	This is in place. Valves are included in the PM System
5.2.2.4 Pumps and compressors		
BAT 62. The following are some of the main factors which constitute BAT: • proper fixing of the pump or compressor unit to its base-plate or frame • having connecting pipe forces within producers' recommendations • proper design of suction pipework to minimise hydraulic imbalance • alignment of shaft and casing within producers' recommendations • alignment of driver/pump or compressor coupling within producers' recommendations when fitted • correct level of balance of rotating parts • effective priming of pumps and compressors prior to start-up • operation of the pump and compressor within producers' recommended performance range (The optimum performance is achieved at its best efficiency	Applicable	This is in place. Pumps and Compressors are included in the PM System and are also included in the Energy management system

point.) • the level of net positive suction head available should always be in excess of the pump or compressor • regular monitoring and maintenance of both rotating equipment and seal systems, combined with a repair or replacement programme.		
BAT 63. BAT is to use the correct selection of pump and seal types for the process application, preferably pumps that are technologically designed to be tight such as canned motor pumps, magnetically coupled pumps, pumps with multiple mechanical seals and a quench or buffer system, pumps with multiple mechanical seals and seals dry to the atmosphere, diaphragm pumps or bellow pumps. For more details see Sections 3.2.2.2, 3.2.4.1 and 4.2.9.	Applicable	This is in place.
BAT 64. BAT for compressors transferring non-toxic gases is to apply gas lubricated mechanical seals.	Applicable	This is in place.
BAT 65. BAT for compressors, transferring toxic gases is to apply double seals with a liquid or gas barrier and to purge the process side of the containment seal with an inert buffer gas.	Not Applicable	
BAT 66. In very high pressure services, BAT is to apply a triple tandem seal system.		
5.2.2.5 Sampling connections		
BAT 67. BAT, for sample points for volatile products, is to apply a ram type sampling valve or a needle valve and a block valve. Where sampling lines require purging, BAT is to apply closed-loop sampling lines. See Section 4.2.9.14.	Applicable	This is in place.
5.3 Storage of solids 5.3.1 Open storage		
BAT 68. BAT is to apply enclosed storage by using, for example, silos, bunkers, hoppers and	Applicable	Salt storage area is being reviewed.

containers, to eliminate the influence of wind and to prevent the formation of dust by wind as far as possible by primary measures. See Table 4.12 for these primary measures with cross-references to the relevant sections.		
BAT 69. BAT for open storage is to carry out regular or continuous visual inspections to see if dust emissions occur and to check if preventive measures are in good working order. Following the weather forecast by, e.g, using meteorological instruments on site, will help to identify when the moistening of heaps is necessary and will prevent unnecessary use of resources for moistening the open storage. See Section 4.3.3.1.	Applicable	This is in place.
BAT 70. BAT for long-term open storage are one, or a proper combination, of the following techniques: • moistening the surface using durable dust-binding substances, see Section 4.3.6.1 • covering the surface, e.g. with tarpaulins, see Section 4.3.4.4 • solidification of the surface, see Table 4.13 • grassing-over of the surface, see Table 4.13.	Applicable	This is in place.
BAT 71. BAT for short-term open storage are one, or a proper combination, of the following techniques: • moistening the surface using durable dust-binding substances, see Section 4.3.6.1 • moistening the surface with water, see Sections 4.3.6.1 • covering the surface, e.g. with tarpaulins, see Section 4.3.4.4.	Not Applicable	
5.3.2 Enclosed storage		
BAT 72. BAT is to apply enclosed storage by using, for example, silos, bunkers, hoppers and containers. Where silos are not applicable, storage in sheds can be an alternative. This is, e.g. the case if apart from storage, the mixing of batches is needed.	Not Applicable	

BAT 73. BAT for silos is to apply a proper design to provide stability and prevent the silo from collapsing. See Sections 4.3.4.1 and 4.3.4.5.	Not Applicable	
BAT 74. BAT for sheds is to apply proper designed ventilation and filtering systems and to keep the doors closed. See Section 4.3.4.2.	Not Applicable	
BAT 75 BAT is to apply dust abatement and a BAT associated emission level of 1 – 10 mg/m^3, depending on the nature/type of substance stored. The type of abatement technique has to be decided on a case-by-case basis. See Section 4.3.7.	*Refer to EPA BAT Guidance Note for BAT associated emission levels*	
BAT 76. For a silo containing organic solids, BAT is to apply an explosion resistant silo (see Section 4.3.8.3), equipped with a relief valve that closes rapidly after the explosion to prevent oxygen entering the silo, as described in Section 4.3.8.4.	Not Applicable	
5.3.4 Preventing incidents and (major) accidents		
BAT 77. BAT in preventing incidents and accidents is applying a safety management system as described in Section 4.1.7.1.	Applicable	This is place and systems are reviewed and upgraded where possible
5.4 Transfer and handling of solids 5.4.1 General approaches to minimise dust from transfer and handling		
BAT 78. BAT is to prevent dust dispersion due to loading and unloading activities in the open air, by scheduling the transfer as much as possible when the wind speed is low. However, and taking into account the local situation, this type of measure cannot be generalised to the whole EU and to any situation irrespective of the possible high costs. See Section 4.4.3.1.	Applicable	This is in place.
BAT 79.	Applicable	This is in place.

When applying a mechanical shovel, BAT is to reduce the drop height and to choose the best position during discharging into a truck; see Section 4.4.3.4.		
BAT 80. BAT then is to adjust the speed of vehicles on-site to avoid or minimise dust being swirled up; see Section 4.4.3.5.2.	Applicable	This is in place.
BAT 81. BAT for roads that are used by trucks and cars only, is applying hard surfaces to the roads of, for example, concrete or asphalt, because these can be cleaned easily to avoid dust being swirled up by vehicles, see Section 4.4.3.5.3. However, applying hard surfaces to the roads is not justified when the roads are used just for big shovel vehicles or when a road is temporary.	Applicable	This is in place.
BAT 82. BAT is to clean roads that are fitted with hard surfaces according to Section 4.4.6.12.	Applicable	This is in place.
BAT 83. Cleaning of vehicle tyres is BAT. The frequency of cleaning and type of cleaning facility applied (see Section 4.4.6.13) has to be decided on a case-by-case basis.	Applicable	This is in place.
BAT 84. Where it neither compromises product quality, plant safety, nor water resources, BAT for loading/unloading drift sensitive, wettable products is to moisten the product as described in Sections 4.4.6.8, 4.4.6.9 and 4.3.6.1. Risk of freezing of the product, risk of slippery situations because of ice forming or wet product on the road and shortage of water are examples when this BAT might not be applicable.	Not Applicable	
BAT 85. For loading/unloading activities, BAT is to minimise the speed of descent and the free fall height of the product; see Sections 4.4.5.6 and 4.4.5.7 respectively. Minimising the speed of descent can be achieved by the following techniques that are BAT: • installing baffles inside fill pipes • applying a loading head at the end of the pipe or tube to regulate the output	Not Applicable	

speed • applying a cascade (e.g. cascade tube or hopper) • applying a minimum slope angle with, e.g. chutes.		
BAT 86. To minimise the free fall height of the product, the outlet of the discharger should reach down onto the bottom of the cargo space or onto the material already piled up. Loading techniques that can achieve this, and that are BAT, are: • height adjustable fill pipes • height adjustable fill tubes, and • height adjustable cascade tubes. These techniques are BAT, except when loading/unloading non drift sensitive products, for which the free fall height is not that critical.	Not Applicable	
5.4.2 Considerations on transfer techniques		
BAT 87. For applying a grab, BAT is to follow the decision diagram as shown in Section 4.4.3.2 and to leave the grab in the hopper for a sufficient time after the material discharge.	Not Applicable	
BAT 88. BAT for new grabs, is to apply grabs with the following properties (see Section 4.4.5.1): • geometric shape and optimal load capacity • the grab volume is always higher than the volume that is given by the grab curve • the surface is smooth to avoid material adhering, and • a good closure capacity during permanent operation.	Not Applicable	
BAT 89. For all types of substances, BAT is to design conveyor to conveyor transfer chutes in such a way that spillage is reduced to a minimum. A modelling process is available to generate detail designs for new and existing transfer points. For more details see Section 4.4.5.5.	Not Applicable	
BAT 90.	Not Applicable	

For non or very slightly drift sensitive products (S5) and moderately drift sensitive, wettable products (S4), BAT is to apply an open belt conveyor and additionally, depending on the local circumstances, one or a proper combination of the following techniques: • lateral wind protection, see Section 4.4.6.1 • spraying water and jet spraying at the transfer points, see Sections 4.4.6.8 and 4.4.6.9, and/or • belt cleaning, see Section 4.4.6.10.		
BAT 91. For highly drift sensitive products (S1 and S2) and moderately drift sensitive, not wettable products (S3) BAT for new situations, is to: apply closed conveyors, or types where the belt itself or a second belt locks the material (see Section 4.4.5.2), such as: • pneumatic conveyors • trough chain conveyors • screw conveyors • tube belt conveyor • loop belt conveyor • double belt conveyor or to apply enclosed conveyor belts without support pulleys (see Section 4.4.5.3), such as: • aerobelt conveyor • low friction conveyor • conveyor with diabolos. The type of conveyor depends on the substance to be transported and on the location and has to be decided on a case-by-case basis.	Not Applicable	
BAT 92. For existing conventional conveyors, transporting highly drift sensitive products (S1 and S2) and moderately drift sensitive, not wettable products (S3), BAT is to apply housing; see Section 4.4.6.2. When applying an extraction system, BAT is to	Not Applicable	

filter the outgoing air stream; see Section 4.4.6.4.		
BAT 93. To reduce energy consumption for conveyor belts (see Section 4.4.5.2), BAT is to apply: • a good conveyor design, including idlers and idler spacing • an accurate installation tolerance, and • a belt with low rolling resistance.	Not Applicable	

Conclusions on BAT from the Industrial Cooling Systems (ICS) BAT Reference Document

Conclusions on BAT	Applicability Assessment (describe how the technique applies or not to your installation)	State whether it is in place or state schedule for implementation
Integrated Heat Management:		
BAT 1. BAT for all installations is an integrated approach to reduce the environmental impact of industrial cooling systems maintaining the balance between both the direct and indirect impacts. In other words, the effect of an emission reduction has to be balanced against the potential change in the overall energy efficiency. There is currently no minimum ratio in terms of the environmental benefits and the possible loss in overall energy efficiency that can be used as a benchmark to arrive at techniques that can be considered BAT. Nevertheless, this concept can be used to compare alternatives (Chapter 3.2 and Annex II).	Applicable	Recirculated cooling systems in operation
BAT 2. Reduction of the level of heat discharge by optimization of internal/external heat reuse. In a greenfield situation, assessment of the required heat capacity can only be BAT if it is the outcome of maximum use of the internal and external available and applicable options for reuse of excess heat. In an existing installation, optimizing internal and external reuse and reducing the amount and level of heat to be discharged must also precede any change to the potential capacity of the applied cooling system. Increasing the efficiency of an existing cooling system by improving systems operation must be evaluated against an increase of efficiency by technological measures through retrofit or technological change. In general and for large existing cooling systems, the improvement of the systems operation is considered to be more cost effective than the application of new or improved technology and can therefore be regarded as BAT.	Applicable	Heat reuse employed where possible-e.g. DI Heating using purged brine, rectifier Heat recovery

BAT 3. Cooling system and process requirements: a) A change in cooling technology to reduce the environmental impact can only be considered BAT if the efficiency of cooling is maintained at the same level or, even better, at an increased level. See table 4.1' *Examples of process requirements and BAT'*. b) Hazardous process substances, which involve a high environmental risk to the aquatic environment in case of leakage, should be cooled by means of indirect cooling systems to prevent an uncontrollable situation. c) A change in cooling technology to reduce the environmental impact can only be considered BAT if the efficiency of cooling is maintained at the same level or, even better, at an increased level.	Applicable	Cooling systems managed to ensure BAT compliance
BAT 4. Cooling system and site requirements: For temperature-sensitive processes it is BAT to select the site with the required availability of cooling water. See table 4.2 *Examples of site characteristics and BAT*. Groundwater - it can be BAT to apply a dry cooling system to minimise GW use.	Not Applicable	
Application of BAT in industrial cooling systems:		
BAT 5. For new cooling installations it is BAT to start identifying reduction measures in the design phase, applying equipment with low energy requiring requirement and by choosing the appropriate material for equipment in contact with the process substance and/or the cooling water.	Applicable	Applied to new systems
BAT 6.	Applicable	Cooling systems managed to

For existing installations, technological measures can be BAT under certain circumstances. Generally, a change in technology is cost-intensive where overall efficiency must be maintained. Cost evaluation should then compare investment costs of the change versus the change in operational costs and validate the reduction effect versus other environmental consequences. For existing wet cooling systems where focus is largely on measures to reduce water use and emissions of chemicals to surface water BAT is operational rather than technological.		ensure BAT compliance
Reduction of energy consumption		
BAT 7. It is BAT in the design phase of a cooling system: • To reduce resistance to water and airflow • To apply high efficiency/low energy equipment • To reduce the amount of energy demanding equipment (Annex XI.8.1) • To apply optimised cooling water treatment in once-through systems and wet cooling towers to keep surfaces clean and avoid scaling, fouling and corrosion.	Applicable	Incorporated in Cooling System design
BAT 8. In terms of the overall energy efficiency of an installation, the use of a once-through systems is BAT, in particular for processes requiring large cooling capacities (e.g. > 10 MWth). Table 4.3 *BAT for increasing overall energy efficiency*.	Not Applicable	No once through used
Reduction of water requirements		
BAT 9. For new systems the following statements can be made: • cooling with water is most efficient with respect to overall energy balance; • For new installations a site should be selected for availability of sufficient (surface)	Applicable to new systems	Will be incorporated in any new system design

water and adequate receiving water in case of large cooling demand; • Cooling demand should be reduced by optimising heat re-use; • Where water is limited a technology should be chosen that enables different modes of operation requiring less water for required cooling capacity; • In all cases recirculated cooling in an option. See table 4.4 *BAT for reduction of water requirements*.		
BAT 10. Reduction of entrainment of organisms. For once through systems or systems with intakes of surface water, BAT is analysis of biotope in surface water source and optimisation of water velocities in intake channels to limit sedimentation.	Not Applicable	
BAT 11. Identified reduction techniques within the BAT-approach. Analysis of the biotope in surface water source, Optimise water velocities in intake channels to limit sedimentation; watch for seasonal occurrence of macrofouling. see table 4.5 *BAT for reduction of entrainment.*	Applicable	Cooling systems managed to ensure BAT compliance
Reduction of emissions to water		
BAT 12. General BAT approach to reduce heat emissions Where the measures generally aim at reducing the ΔT of the discharged cooling water, a few	Not Applicable	

conclusions on BAT can be drawn. Pre-cooling (Annex XII) has been applied for large power plants where the specific situation requires this, e.g. to avoid raised temperature of the intake water. Discharges will have to be limited with reference to the constraints of the requirements of Directive 78/659/EEC for fresh water sources. The criteria are summarised in Table 3.6. Reference is made to a provision in Article 11 of this directive regarding derogation of the requirements in certain circumstances.		
BAT 13. General BAT approach to reduce chemical emissions to water. With respect to the selection of chemicals, it has been concluded that a ranking of treatments and the chemicals of which they are composed is difficult if not impossible to carry out in a general way and would be unlikely to lead to BAT conclusions. Due to the large variation in conditions and treatments only a site-by-site assessment will lead to the appropriate solution. Such an assessment and its constituent parts could represent an approach that can be considered BAT.	Applicable	Treatment chemicals used are supplied by industry specific company with longstanding reputation
BAT 14. 80% of environmental impact is decided on design table, measures should be taken in the design of wet cooling system using the following order of approach: • Identify process conditions (P, T, corrosiveness); • Identify chemical characteristics of cooling water sources;	Applicable	Will be incorporated in any new system design

• select appropriate material for heat exchanger for both process and cooling water characteristics; • select appropriate materials for other parts of the cooling system; • Identify operational requirements of the cooling system; • Select feasible cooling water treatment using less hazardous chemicals or lower potential for environmental impact; • apply biocide selection scheme; • optimise dosage regime by monitoring of cooling water and systems conditions;		
Identified reduction techniques within the BAT-approach		
BAT 15. Prevention by design & maintenance See table 4.6 BAT for reduction of emissions to water by design and maintenance techniques	Applicable	Cooling systems managed to ensure BAT compliance
BAT 16. Control by optimised cooling water treatment See table 4.7 *BAT for reduction of emissions to water by optimised cooling water treatment* Reduction of emissions to air	Not Applicable	Cooling systems managed to ensure BAT compliance
BAT 17. Identified reduction techniques within the BAT-approach See table 4.8. *BAT for reduction of emissions to air* Identified reduction techniques within the BAT approach for all wet cooling towers:	Applicable	Cooling systems managed to ensure BAT compliance

i) Avoid plume reaching ground level ii) Avoid plume formation iii) Use of less hazardous material iv) Avoid affecting indoor air quality v) Reduction of drift loss		
Reduction of noise emissions		
BAT 18. Identified reduction techniques within the BAT-approach See table 4.9 *BAT for reduction of noise emissions* Identified reduction techniques within the BAT approach for natural draught cooling towers: i) reduce noise of cascading water at inlet: ii) reduce noise emission around tower base Identified reduction techniques within the BAT approach for mechanical draught cooling towers: iii) reduction of fan noise iv) optimised diffuser design No Standard commercial cooling tower utilised - low noise v) noise reduction	Applicable	Cooling systems managed to ensure BAT compliance
BAT to reduce the risk of leakage		
BAT 19. Identified reduction techniques within the BAT-approach See table 4.10 *BAT to reduce the risk of leakage*. The following general measures to reduce the occurrence of leakages can be applied: i) select material for equipment of wet cooling systems according to applied water quality ii) operate the system according to its design iii) if cooling water treatment is needed, select the right cooling water	Applicable	Materials Reviewed at the design stage. Cooling systems managed to ensure BAT compliance

treatment programme; iv) monitor leakage in cooling water discharge in recirculating wet cooling systems by analysing the blowdown		
Reduction of biological risk		
BAT 20. Identified reduction techniques within the BAT approach See table 4.11 *BAT to reduce biological growth* Identified reduction techniques within the BAT approach for all wet recirculating cooling systems: i) reduce algae formation ii) reduce biological growth iii) cleaning after outbreak iv) control of pathogens Identified reduction techniques within the BAT approach for all open wet cooling towers: v) reduce risk of infection	Applicable	Cooling systems managed to ensure BAT compliance

Conclusions on BAT from the Energy Efficiency (EE) BAT Reference Document

Conclusions on BAT	Applicability Assessment (describe how the technique applies or not to your installation)	State whether it is in place or state schedule for implementation
BAT 1. BAT is to implement and adhere to an energy efficiency management system (ENEMS) that incorporates, as appropriate to the local circumstances, all of the following features (see Section 2.1. The letters (a), (b), etc. below, correspond those in Section 2.1): a. commitment of top management (commitment of the top management is regarded as a precondition for the successful application of energy efficiency management); b. definition of an energy efficiency policy for the installation by top management; c. planning and establishing objectives and targets (see BAT 2, 3 and 8) ; d. implementation and operation of procedures paying particular attention to: i) structure and responsibility ii) training, awareness and competence (see BAT 13); iii) communication iv) employee involvement	Applicable	An ENEMS will be implemented and maintained.

v) documentation vi) effective control of processes (see BAT 14) vii) maintenance (see BAT 15) viii) emergency preparedness and response ix) safeguarding compliance with energy efficiency-related legislation and agreements (where such agreements exist). e. benchmarking, f. checking performance and taking corrective active, g review of EMS		
BAT 2. BAT is to continuously minimise the environmental impact of an installation by planning action & investments on an integrated basis and for the short, medium and long term, considering the costs/benefits & cross media effects.	Applicable	Monitoring of efficiency is carried out.
BAT 3. BAT is to identify the aspects of an installation that influence EE by means of an audit.	Applicable	An energy audit has been performed and recommendations acted upon.
BAT 4. When carrying out an audit, BAT is to ensure that the audit identifies the following aspects (See BREF Section 2.11) : This BATC lists the aspects to be considered (a) - (f):	Applicable	An energy audit has been performed and recommendations acted upon.

a. energy use and type in the installation and its component systems and processes; b. energy-using equipment, and the type and quantity of energy used in the installation; c. possibilities to minimise energy use, such as: • controlling/reducing operating times, e.g. switching off when not in use (e.g. see Sections 3.6, 3.7, 3.8, 3.9, 3.11) • ensuring insulation is optimised, e.g. see Sections 3.1.7, 3.2.11 and 3.11.3.7 • optimising utilities, associated systems, processes and equipment (see Chapter 3); d. possibilities to use alternative sources or use of energy that is more efficient, in particular energy surplus from other processes/ systems, see Section 3.3; e. possibilities to apply energy surplus to other processes and/or systems, see Section 3.3; f. possibilities to upgrade heat quality (see Section 3.3.).		
BAT 5. BAT is to use appropriate tools/methods to identify/quantify energy optimisation, eg models databases & balances; techniques such as pinch technology, thermoeconomics; estimates & calculations.	Applicable	An energy audit has been performed and recommendations acted upon.
BAT 6. BAT is to Identify opportunities to optimise energy recovery within and between systems at the installation, including 3rd parties as per BREF 3.2-3.4	Applicable	An energy audit has been performed and recommendations acted upon.

BAT 7. BAT is to Optimise EE through a systems approach to energy management.	Applicable	This will be done through the ENEMS
BAT 8. BAT is to establish EE indicators by carrying out all of the following: to be developed as per section 4.2.2.4 a. identifying suitable energy efficiency indicators for the installation, and where necessary, individual processes, systems and/or units, and measure their change over time or after the implementation of energy efficiency measures. b. identifying and recording appropriate boundaries associated with the indicators. c. identifying and recording factors that can cause variation in the energy efficiency of the relevant process, systems and/or units.	Applicable	These were established as part of the Energy Audit
BAT 9. BAT is to carry out sectoral/regional/national benchmarking.	Applicable	This will be done through the ENEMS
BAT 10. BAT is to optimise EE when planning a new installation, unit, system or significant upgrade by considering the list in 4.2.3: a. the energy efficient design (EED) should be initiated at the early stages of the conceptual design/basic design phase b. the development and/or selection of energy efficient technologies c. additional data collection may need to be carried out to supplement existing data or fill gaps in knowledge d. the EED work should be carried out by an energy expert e. the initial mapping of energy consumption should also address which parties in the project organisations influence the future energy consumption, and should optimise EED of the future plant with them.	Applicable	Future investments will include these

BAT 11. Optimise EE/Energy recovery between systems/processes /parties at installations.	Applicable	This will be done through the ENEMS
BAT 12. Maintain impetus of EE initiatives as per list	Applicable	Performed through annual review.
BAT 13. Maintain expertise in EE/energy using systems through recruitment/training; use of specialist staff/systems/functions; resource sharing.	Applicable	Performed through staff instruction, training and review.
BAT 14. Implement effective process control through: compliance with procedures; EE performance parameters identified & optimised, and docmented/recorded. a. having systems in place to ensure that procedures are known,understood and complied with. b. ensuring that the key performance parameters are identified, optimised for energy efficiency and monitored. c. documenting or recording these parameters	Applicable	Performed through staff instruction, training and review.
BAT 15. Carry out maintenenace to optimise EE through measures specified in 4.2.8. a. clearly allocating responsibility for the planning and execution of maintenance. b. establishing a structured programme for maintenance based on technical descriptions of the equipment, norms, etc. as well as any equipment failures and consequences. Some maintenance activities may be best scheduled for plant shutdown periods. c. supporting the maintenance programme by appropriate record keeping systems and diagnostic testing.	Applicable	Performed through staff instruction, training and review.

d. identifying from routine maintenance, breakdowns and/or abnormalities possible losses in energy efficiency, or where energy efficiency could be improved. e. identifying leaks, broken equipment, worn bearings, etc. that affect or control energy usage, and rectifying them at the earliest opportunity.		
BAT 16. Establish & maintain documented procedures to measure characteristics of operations with a significant impact on EE.	Applicable	This will be done through the ENEMS
BAT 17. BAT is to optimise EE of combustion by related techniques such as: i) Advanced computer control of combustion conditions. ii) reduced excess air. iii) pre-heating of fuel gas. iv) pre-heating of combustion air.	Applicable	This is monitored annually
BAT 18. BAT for steam systems is to optimise EE by using techniques such as: those measures listed in 4.2 in regard to design, operation/control, generation and distribution, recovery of condensate.	Applicable	This is monitored annually
BAT 19. Maintain heat exchanger efficiency by monitoring efficiency & preventing/removing fouling.	Applicable	This is monitored annually
BAT 20. BAT is to seek possibilities for cogeneration inside and /or outside the installation (with a third party).	Not Applicable	

BAT 21. Increase power factor according to local power distributor requirements: a. Installing capacitors in the AC circuits to decrease the magnitude of reactive power. or lightly loaded motors. b. Minimising the operation of idling. c. Avoiding the operation of equipment above its rated voltage. d. When replacing motors, using energy efficient motors.	Applicable	This is in place
BAT 22. Check for harmonics & apply filters if required.	Applicable	This is in place
BAT 23. Optimise various power supply efficiency measures. a. Ensure power cables have the correct dimensions for the power demand. b. Keep online transformer(s) operating at a load above 40 50 % of the rated power. c. Use high efficiency/low loss transformers.	Applicable	This is in place

BAT 24. Optimise electric motors as per section 4.3.6a. a. Using energy efficient motors (EEM). b. Proper motor sizing c. Installing variable speed drives (VSD) d. Installing high efficiency transmission/reducers e. Use direct coupling where possible, synchronous belts or cogged V-belts in place of V belts and helical gears in place of worm gears. f. Energy efficient motor repair (EEMR) or replacement with an EEM. g. Rewinding: avoid rewinding and replace with an EEM, or use a certified rewinding contractor (EEMR). h. Power quality control I. Integrate lubrication, adjustments and tuning into system operation and maintenance.	Applicable	This is in place
BAT 25. Optimise compressed air systems (CAS) as per table 4.6.	Applicable	This is place and systems are reviewed and upgraded where possible
BAT 26. Optimise pumping systems as per 4.3.8	Applicable	This is place and systems are reviewed and upgraded where possible
BAT 27. Optimise HVAC systems as per 4.3.9	Not Applicable	
BAT 28. Optimise lighting systems as per 4.3.10.	Applicable	This is place and systems are reviewed and upgraded where possible
BAT 29. BAT is to optimise drying, separation and concentration processes by using techniques such as those in Table 4.10 according to applicability, and to seek opportunities to use mechanical separation in conjunction with thermal processes.	Not Applicable	

Attachment No. B.5.

Tabular Data on Emission and Monitoring Points

Point Code	Point Type	Easting	Northing	Verified	Emission/ monitoring
References assigned in existing licence	A=Atmospheric SW=Surface Water SE = Sewer GW=Groundwater N = Noise SL=Soil/Ground WS=Waste	6E-digit GPS Irish National Grid Reference	6N-digit GPS Irish National Grid Reference	Y = GPS used N = GPS not used	E / M
A2-1	Atmospheric	180576E	099395N	N	Both
A2-2	Atmospheric	180580E	099391N	N	Both
A2-3	Atmospheric	180577E	099390N	N	Both
SE1	Sewer	180600E	099311N	N	Both
GW1	Groundwater	180525E	099440N	N	Both
GW2	Groundwater	180529E	099331N	N	Both
GW3	Groundwater	180623E	099306N	N	Both

Attachment No. C.1

Waste Prevention

The company is committed to operating in accordance with the waste hierarchy as defined by the Waste Framework Directive and preventing and minimizing the generation of waste where practicable. Details of all hazardous and non-hazardous wastes generated on-site are recorded and reviewed on an annual basis. In addition, the company considers waste prevention and management when planning its operations. Micro-Bio will continue to minimise waste generation on-site and, where not possible to reduce at source, will aim to reuse and recycle waste in accordance with the waste hierarchy.

The following measures currently take place to prevent waste being generated on-site:

- Plastic packaging containers, including IBC's and drums, are mostly reused I.e. sent to customer sites then returned, washed and reused. Only 25 litre containers are used once, then recycled.
- Wood pallets used during the transport of finished product containers are reused until they are no longer fit for purpose.

Attachment No. C.2.

TABLE C.2(i): Generation of waste at the installation and its management

Waste description	LoW[11] Code (Commission Decision 2000/532/EC, as amended in 2014[12]) (use asterisk to indicate whether hazardous waste or not)	Category per Animal By-products Regulation 1069/2009	Source of waste	Quantity generated (tonnes per month)	Location of recovery of disposal (on-site, off-site)	Method of recovery or disposal (e.g. recycling, energy recovery, other incineration, landfill)
Construction Material Containing Asbestos	17 06 05	N/A	Construction and Demolition Waste	11.1 (per year)	Off-site, Rilta Environmental, Greenogue Business Park, Rathcoole, Dublin (NWCPO-09-01192-02)	Landfill (D1)
Plastic Packaging	15 01 02	N/A	Site operations	0.24 (on average)	Off-site, Greenstar, Forge Hill, Kinsale, Cork	Organic substance recycling/reclama

[11] List of Waste, http://www.epa.ie/pubs/reports/waste/stats/wasteclassification/EPA_Waste_Classification_2015_Web.pdf
[12] Commission Decision 2014/955/EU

					(WCP-DC-09-1120)	tion (R3)
Paper and Cardboard	20 01 01	N/A	Site operations	0.27 (on average)	Off-site, Greenstar, Forge Hill, Kinsale, Cork (WCP-DC-09-1120)	Organic substance recycling/reclamation (R3)
Biodegradable Kitchen and Canteen Waste	23 01 08	N/A	Kitchen and Canteen Waste	2.5 (on average)	Off-site, Waste Recovery Services Limited, Cullenagh, Fermoy, Co. Cork	Landfill (D1)

Attachment No. C.3

Waste hierarchy

The company is committed to operating in accordance with the waste hierarchy as defined by the Waste Framework Directive and preventing and minimizing the generation of waste where practicable. Details of all hazardous and non-hazardous wastes generated on-site are recorded and reviewed on an annual basis. In addition, the company considers waste prevention and management when planning its operations. Micro-Bio will continue to minimise waste generation on-site and, where not possible to reduce at source, will aim to reuse and recycle waste in accordance with the waste hierarchy.

All waste which arises on-site is segregated into different waste streams, collected separately and sent off-site via appropriately authorized waste contractors for to undergo waste recovery operations ideally. Waste is sent off-site for disposal to landfill only as a last resort where it is not feasible or practicable to recover the waste.

Oily sludge waste from maintenance operations of the plant and equipment is collected by a hazardous waste operator and recovered via oil reprocessing. Lab chemical waste is collected by hazardous waste operated and is reprocessed and recovered where feasible. Plastic materials (saturated or spent ion exchange resins and plastic packaging) and paper and cardboard materials which are generated on-site are baled in the warehouse building on-site (Building 4) and subsequently sent off-site for reprocessing and recycling. WEEE which arises on-site on an occasional basis is also collected by authorized waste operators and ultimately sent for shredding and reprocessing. At the present time the only waste sent for disposal is the small volume of biodegradable kitchen and canteen waste which is generated on-site. This waste is sent to landfill however the company proposes on investigating whether it is practically and economically feasible to send this waste to a composting facility in the local area or wider region.

All hazardous waste (oily waste and lab chemical waste) which arises on-site and has to be retained on-site for a period of time is stored in dedicated containers on spill pallets or in bunded areas to prevent any accidental spill to the yard area and discharge via the Waste Water Treatment Plant and/or release to the environment, until removal from on-site by an appropriately authorized hazardous waste collector. This also serves to prevent hazardous waste being mixed with and contaminating non-hazardous waste.

Attachment No. D.1b

Impact of Emissions

Environmental Quality Objectives and Standards for air, surface water and groundwater have been changed since the grant of the licence P0082-02 in 2008 by the enactment of the following regulations:

- Air Quality standards Regulations 2011 (S.I. No. 180 of 2011)
- European Communities Environmental Objectives (Surface Waters) Regulations, 2009 (S.I. No. 272 of 2009)
- European Communities Environmental Objectives (Groundwater) Regulations, 2010 (S.I. No. 9 of 2010)

Environmental Quality Objectives and Standards for Air

The Ambient Air Quality and Cleaner Air for Europe (CAFE) Directive (2008/50/EC) was published in May 2008. It replaced the Framework Directive and the first, second and third Daughter Directives. The fourth Daughter Directive was transposed into Irish legislation by the Arsenic, Cadmium, Mercury, Nickel and Polycyclic Aromatic Hydrocarbons in Ambient Air Regulations 2009 (S.I. No. 58 of 2009).

The CAFE Directive was transposed into Irish legislation by the Air Quality Standards Regulations 2011 (S.I. No. 180 of 2011). It replaces the Air Quality Standards Regulations 2002 (S.I. No. 271 of 2002), the Ozone in Ambient Air Regulations 2004 (S.I. No. 53 of 2004) and S.I. No. 33 of 1999.

The Air Quality Standards (Amendment) and Arsenic, Cadmium, Mercury, Nickel and Polycyclic Aromatic Hydrocarbons in Ambient Air (Amendment) Regulations (S.I. No. 659 of 2016) were introduced and made changes to the aforementioned regulations.

Micro-bio are licensed to discharge Chlorine (at emission point A2-1) and Hydrogen Chloride (at emission points A2-2 & A2-3) from its installation. The aforementioned regulations did not establish any Air Quality Standard for these parameters. Regardless, no ELV set for any licensed air emission was exceeded in 2016, the company achieving a 100% compliance rate. It is therefore deemed that Micro-bio do not adversely impact upon or reduce the ambient air quality in the local area or the air quality zone it resides in (Zone D: Rural Ireland).

Environmental Quality Standards for Surface Water

The Surface Water Regulations (S.I. No. 272 of 2009), as amended, establishes Environmental Quality Standards (EQS's) for the ecological and chemical status of Irish surface water bodies in line with the Water Framework Directive 2000/60/EC. The purpose of the regulations is to spur the improvement of the quality of surface water bodies across the country.

Wastewater effluent which arises as a result of operations at the company's installation comprises of brine purge from electrolysis plant, regeneration streams from the Water Demineralisation and Water Softening Plants, drum wash water, plant wash-down water,

cooling tower blowdown and domestic effluent. Wastewater from Micro-bio's installation is discharged into a Wastewater Treatment Plant where it undergoes waste water treatment involving solids settling, followed by equalisation, followed by neutralisation and dechlorination prior to discharge to the River Blackwater. No priority substances as listed by the aforementioned Surface Water Regulations are discharged from the site.

Effluent monitoring takes place in accordance with Schedule C.3.2 of the licence P0082-02. Emission Limit Values (ELV's) for effluent discharges have been set for parameters of potential of potential concern under Schedule B.3 of the licence. Effluent monitoring has shown that no ELV's prescribed under the licence have been exceeded in 2016.

The EPA undertakes River Water Quality monitoring on the River Blackwater downstream from where the company discharges its treated effluent passed the Fermoy bridge (Station Name : W of Kilmurry Ho). Their most recent monitoring at this monitoring station shows that the water quality of the River Blackwater at this location along the river has been consistently of a 'Good' status. Good status is defined by the regulations as follows: *'The values of the biological quality elements for the surface water body type show low levels of distortion resulting from human activity, but deviate only slightly from those normally associated with the surface water body type under undisturbed conditions*.'

It is therefore deemed treated effluent discharge from the emission point SE1 has a negligible adverse impact upon the River Blackwater. There is no recorded evidence of site discharges causing a breach of surface water EQS's in the River Blackwater. The following Environmental Objective as set by Part III Section 28 (1) of the regulations is therefore being achieved at the River Blackwater downstream from the site discharge location:

'(1) A surface water body whose status is determined to be high or good (or good ecological potential and good surface water chemical status as the case may be) when classified by the Agency in accordance with these Regulations shall not deteriorate in status.'

Environmental Quality Standards for Groundwater

The Groundwater Regulations (S.I. No. 9 of 2010), as amended, established Environmental Quality Standards for groundwater bodies known as Groundwater Threshold Values in line with the Water Framework Directive 2000/60/EC. These GTV's have been

The company is required to undertake groundwater monitoring in accordance with Schedule C.5 of its existing licence. The company conducts monitoring of groundwater underlying its site at three groundwater monitoring locations: GW1, GW2 and GW3. This monitoring takes place on a biannual basis. In 2016 groundwater monitoring results showed that there was no exceedance of any relevant GTV as specified by the regulation, nor did the results show an upward trend in the concentration of monitored parameter. It is therefore deemed that there have been no releases of polluting materials of potential concern from the site to underlying groundwater.

Attachment No. D.1c

Emissions to Sewer

There are no direct trade effluent emissions to public sewer. Micro-bio's trade effluent is treated at their own wastewater treatment plant prior to discharge. The treated trade effluent discharged from Micro-Bio is not further treated by the undertaker (Cork County Council) and discharges directly to the River Blackwater a few meters downstream of the bridge in Fermoy Town centre.

Micro-bio employ the following Best Available Techniques for emissions to water to ensure that no polluting substances are discharged to receiving water bodies:

- Process-integrated techniques to prevent or reduce the generation of pollutants, namely
    i. High Performance membranes, electrodes and coatings and high purity brine are all used.
    ii. Planned membrane change-outs to maintain plant efficiency and to ensure lower emissions of Brine Purge solution leading to reductions in the quantities of Chloride, Sulphate and TDS discharged.
    iii. Planned recoating's to maintain plant efficiency and reduce emissions
    iv. A chlorate decomposition system was installed at the plant in 2003 as part of a Cleaner Greener Production Programme (CGPP) project. This had the effect of allowing increased recycling of the waste brine stream thus reducing the discharge of chloride to drain which would result from bleeds from the brine circuit
    v. Brine recirculation
- Final waste water treatment prior to discharge: involving solids settling, followed by equalisation, followed by neutralisation and dechlorination.

Considering the above BAT implemented at the installation and considering monitoring results show compliance with the ELV's set for effluent discharges as well the current 'good' quality status of the receiving River Blackwater downstream from the discharge point, it is deemed that the licence secures a good level of environmental protection and the licensed activity will not result in an higher levels of pollution in the receiving water body.