1. Best Available Techniques (BAT) Conclusions for organic fine chemicals

Table 1.1 Comparison with BAT Conclusions for organic fine chemicals

BAT reference No	BAT Conclusion Requirements	How this will be addressed by proposed changes
	5.1 PREVENTION AND MINIMISATION OF ENVIRONMENTAL IMPACT	
	5.1.1 Prevention of environmental impact	
	5.1.1.1 Integration of environmental, health and safety considerations into process development	
5.1.1.1	There should be an auditable trail for the integration of environmental, health and safety considerations into process development. New processes should achieve the following: improve process design to maximise the incorporation of all the input materials used into the final product; use substances that possess little or no toxicity to human health and the environment; avoid the use of auxiliary substances; minimise energy requirements in recognition of the associated environmental and economic impacts; use renewable feedstock rather than depleting, wherever technically and economically practicable; avoid unnecessary derivatisation; and apply catalytic reagents (which are typically superior to stoichiometric reagents).	Within the requirements of the product specification and hence chemicals composition and properties, Lianhetech have undertaken the process design based on good manufacturing practice and current processes to address these BAT requirements. As noted under specific BAT requirements, the process chemistry has been developed to optimise process yield at each sequential stage, minimise waste and recover and reuse recycled solvent transfer media such as acetonitrile and dichloromethane as far as possible.
	5.1.1.2 Process safety and prevention of runaway reactions	
5.1.1.2.1	A structured safety assessment for normal operation should be carried out and should take into account effects due to deviations of the chemical process and deviations in the operation of the plant. The safety assessment should include one or a combination of the following techniques: organisational measures, concepts involving control engineering techniques, reaction stoppers (e.g. neutralisation, quenching), emergency cooling, pressure resistant construction and pressure relief.	A structured safety assessment of the proposed new plant and process has been undertaken. The COMAH report and environmental risk assessment have been reviewed and updated to reflect the outcome of the safety assessment. This assessment is referenced in the LSS report LC900 1500 Te – COMAH Risk Assessment Review – Rev 0, which is available on request. Key safety techniques include the use of appropriately trained and experienced staff, detailed process operating procedures, appropriate control techniques to monitor / control pressure and temperature and initiate shut down, emergency cooling, the use of appropriate grade / specification stainless steel to resist corrosion. Note that the proposed reactions will take place at ambient pressure or under vacuum and maximum temperatures will not significantly exceed 100°C.
5.1.1.2.2	Procedures and technical measures to limit risks from the handling and storage of hazardous substances should be established and implemented.	The materials and chemicals proposed to be used are mostly consistent with those currently used for manufacturing processes. Lianhetech are familiar and experienced in the storage, handling and use of these chemicals. Detailed operational procedures, such as dedicated and segregated storage of incompatible materials, handling and vessel charging, have been developed, which are described in the site's BMS system and process specific batch cards.

BAT reference No	BAT Conclusion Requirements	How this will be addressed by proposed changes
5.1.1.2.2	Sufficient and adequate training should be provided for operators who handle hazardous substances.	Lianhetech has an environmental management system which is certified to ISO 14001 2015. Certificate No GB09/77969, valid until 09/02/2024 issued by SGS. This includes reference to procedures for the training and competence assessment of all operators who will work on the proposed new process.
	5.1.2 Minimisation of environmental impact	
	5.1.2.1 Plant design	
5.1.2.1	The following techniques should be used to minimise emissions in the design of new plants: using closed and sealed equipment, closing the production building and ventilating it mechanically, using inert gas blanketing for process equipment where VOCs are handled, connecting reactors to one or more condensers for solvent recovery, connecting condensers to the recovery/abatement system, using gravity flow instead of pumps, enabling the segregation and selective treatment of waste water streams, enabling a high degree of automation by application of a modern process control system in order to ensure a stable and efficient operation.	Key techniques to minimise emissions from the proposed plant are consistent with those already used for the control of emissions from permitted processes undertaken at the installation. These include: • The use of nitrogen blanketing for process safety requirements. • The ducting of reactors and vessels to counter current aqueous caustic scrubbers, prior to discharge to air via release point A1/3. • The connection of reactors and vessels containing solvents, especially methylene dichloride, acetonitrile and ethanol to condensers for solvent recovery and reuse. • The charging of volatile, fine particulate and hazardous materials into reaction vessels through contained loading arrangements. • The separate collection of acidic and alkaline wastewater, prior to offsite treatment and disposal as liquid waste. • The use of appropriately trained and experienced staff including detailed process operating and control procedures. • Comprehensive process monitoring and control systems. Further details of these measures are given in the process description in the non-technical summary of the application report.
	5.1.2.2 Ground protection and water retention options	
5.1.2.2	Facilities where substances which represent a potential risk of contamination of ground and groundwater are handled should be designed, built, operated and maintained so that spill potential is minimised. Facilities have to be sealed, stable and sufficiently resistant against possible mechanical, thermal or chemical stress.	The new process will take place within building Workshop 3. This is within the existing permit installation boundary and is associated with manufacturing activities of a similar nature. The building has a concrete floor and drainage is to a contained system. Existing arrangements for spillage prevention and control have been reviewed and the design, procedures and proposed operator training are considered to be compliant with this BAT requirement.
5.1.2.2	Leakages should be able to be quickly and reliably recognised.	Through the process monitoring and control system and operator training, consistent with the operation of manufacturing processes within this building under the existing permit, operators will be able to identify and respond to leaks efficiently,

BAT reference No	BAT Conclusion Requirements	How this will be addressed by proposed changes
5.1.2.2	To enable treatment or disposal, sufficient retention volumes to safely retain spills and leaking substances at the facility should be provided.	The review of the dimensions of Workshop 3 confirms there is sufficient capacity to contain the volume of the largest foreseeable spillage / loss of containment of the proposed chemical inventory.
5.1.2.2	There should be sufficient retention volume to safely retain fire fighting water and contaminated surface water.	A review of the existing fire risk assessment has been undertaken and the capacity for containment of fire fighting water has been evaluated. This confirms there will be no changes to the anticipated volume of fire fighting water for Workshop 3, as a result of the proposed changes. The building floor is connected to a drainage system and any fire fighting water within the building would be retained within the existing drainage arrangements.
5.1.2.2	All of the following techniques should be applied for ground protection and water retention: carrying out loading and unloading only in designated areas protected against leakage run-off; storing and collecting materials awaiting disposal in designated areas protected against leakage run-off; fitting all pump sumps or other treatment plant chambers from which spillage might occur with high liquid level alarms or regularly supervising pump sumps by personnel; establishing programmes for testing and inspecting tanks and pipelines including flanges and valves; providing spill control equipment, such as containment booms and suitable absorbent material; testing and demonstrating the integrity of bunds; and equipping tanks with overfill prevention.	The site employs the described techniques to minimise the potential for pollution of ground and ground water. The site also has comprehensive hardstanding and a sealed drainage system with a proactive monitoring, inspection and maintenance system.
	5.1.2.3 Minimisation of VOC emissions	
5.1.2.3.1	To minimise uncontrolled emissions, openings should be closed and sources should be contained and enclosed.	The processes will take place within closed reactor vessels within workshop 3, thus minimising the potential for the uncontrolled release of VOCs.
5.1.2.3.2	Drying should be carried out using closed circuits, including condensers for solvent recovery.	All vessels containing solvents will be in closed circuits including condensers for solvent recovery, this is a part to the design of the future process.
5.1.2.3.3	Equipment should be kept closed for rinsing and cleaning with solvents.	If cleaning is undertaken between process runs, solvents that are used for cleaning the systems will be kept sealed and connected to the solvent recovery condensers.
5.1.2.3.4	Where allowed by purity requirements, process vapours should be recirculated.	Process vapours will not be recirculated due to the liquid phase chemistry associated with the modifications and the design requirement to minimise losses of solvents to air and optimise use of raw materials. Solvents are condensed as outlined above.
	5.1.2.4 Minimisation of exhaust gas volume flows and loads	
5.1.2.4.1	Any unnecessary openings should be closed to prevent air being sucked to the gas collection system via the process equipment.	The processes will take place within closed reactor vessels thus preventing the potential for air ingress.

BAT reference No	BAT Conclusion Requirements	How this will be addressed by proposed changes
5.1.2.4.2	The airtightness of process equipment should be ensured, especially for vessels.	The process reactors and associated pipework will be designed and constructed for airtightness as outlined below.
5.1.2.4.3	Testing airtightness of the equipment is carried out regularly and enables the application of shock inertisation instead of continuous inertisation. Still, continuous inertisation has to be accepted due to safety requirements, e.g. where processes generate O_2 or where processes require further loading of material after inertisation.	Air tightness will be tested at the start of each batch. In addition, there is a short pressure test at the start of each batch and a full pressure test every 2 weeks. Additionally, there is a continuous nitrogen purge. There will also be online oxygen monitoring on vessels with process inerting on any vessel after the pressure test for solvents above their flash point. There will be continuous inerting on oxygen generators and shock inerting if the oxygen goes too high.
5.1.2.4.4	The exhaust gas volume flows from distillations should be minimised by optimising the layout of the condenser.	The process reactors and associated pipework will be designed and constructed to ensure the optimum layout of the condenser.
5.1.2.4.5	Liquid addition to vessels should be carried out as bottom feed or with dip-leg, unless reaction chemistry and/or safety considerations make it impractical. In such cases, the addition of liquid as top feed with a pipe directed to the wall reduces splashing and hence, the organic load in the displaced gas.	The process is designed to incorporate to accommodate top feed for transfers to minimise the organic load of the displaced gas
5.1.2.4.5	If both solids and an organic liquid are added to a vessel, the solids should be used as a blanket in circumstances where the density difference promotes the reduction of the organic load in the displaced gas, unless reaction chemistry and/or safety considerations make it impractical	Two solid chargers will be used. The order of the transfer will be dependent on the process chemistry.
5.1.2.4.6	The accumulation of peak loads and flows and related emission concentration peaks should be minimised through optimisation of the production and by application of smoothing filters.	Detailed process descriptions and control arrangements have been developed in conjunction with the design and will be implemented to minimise peak loads and flows. Low inventory and continuous feed stock to wiped film evaporator will remove peak loading of volatile emissions in exhaust gases. As a batch process, the number of concurrent solvent charges will be limited, this processing constraint will operate to reduce peak loads and flows.
	5.1.2.5 Minimisation of volume and load of wastewater streams	
5.1.2.5.1	The separation of products or intermediates from aqueous solutions frequently creates highly loaded aqueous mother liquors. Especially where the product is obtained by salting out or bulk neutralisation, a work-up of such mother liquors is often hindered by the high salt content. Alternative separation of products or intermediates can increase yields or even the product quality, but the technical applicability of alternative separation techniques needs to be assessed for each case individually.	Aqueous streams are disposed of via the waste system and not through wastewater stream. The process has been designed and optimised to minimise waste streams whilst maximising product yields. The aqueous alkaline and acidic waste streams are produced separately, and composition has been evaluated to ensure the most appropriate treatment is employed. As part of continuous improvement to the manufacturing process, Lianhetech is investigating reagent exchange from aqueous to anhydrous reagent delivery to process. Under pilot trial this has demonstrated an increase in product yields and a

BAT reference No	BAT Conclusion Requirements	How this will be addressed by proposed changes
		reduction in volume and salt levels in aqueous waste streams.
5.1.2.5.2	Counter current product washing should be used where the production scale justifies the introduction of the technique.	Wash water will be reused where possible, with final wash waters being used for initial washes to minimise water use.
5.1.2.5.3	Water-free vacuum generation should be applied.	The vacuum system will be water free.
5.1.2.5.4	For batch processes, clear procedures for determining the desired end point of the reaction should be established.	Documented in-process checks are currently in place to ensure the desired reaction completion is achieved. There will be no requirement to update these arrangements.
5.1.2.5.5	Indirect cooling should be applied.	Temperature control modules will be installed on the reactor vessels, these provide indirect heating or cooling of the vessel contents.
5.1.2.5.6	A pre-rinsing step prior to rinsing/cleaning of equipment should be applied to minimise organic loads in wash-waters.	There will be a limited requirement to clean equipment, based on servicing and maintenance requirements. The need to cleaning equipment will be reduced by inter-batch cleaning steps as and when required. Pre and post engineering cleaning is standard site operating practice designed to minimise the organic loads in washwaters.
	5.1.2.6 Minimisation of energy consumption	
5.1.2.6	Options to optimise energy consumption should be assessed and implemented.	The energy use is expected to increase in line with the increase in production. The main energy users are electrical motors and drives for pumps, agitators, chillers and air compressors, there will also be an additional high efficiency steam boiler. Energy efficiency is incorporated into the design and procurement of the process equipment, electrical equipment and the gas boiler as outlined in the Energy Efficiency Assessment.
	5.2 MANAGEMENT AND TREATMENT OF WASTE STREAMS	
	5.2.1 Mass balances and process waste stream analysis	
5.2.1.1.1	Mass balances for VOCs (including CHCs), TOC or COD, AOX or EOX and heavy metals should be established on a yearly basis.	Mass balances as required by the permit will be undertaken on, at least, a yearly basis.
5.2.1.1.2	Detailed waste stream analysis should be carried out to identify the origin of the waste stream and a basic data set to enable management and suitable treatment of exhaust gases, wastewater streams and solid residues.	During the design of the process detailed analysis of the waste streams was undertaken to characterise solid and liquid waste streams generated and emissions to air. These assessments have informed: -Design of the process. -Arrangements for segregation and management of liquid wastes. -Reuse, recovery and disposal options for solvents and solid wastes. -Ongoing analysis of waste streams and continuous improvements in response to findings. There will be no change to the procedures currently used on site due to the new process. However, in addition to

BAT reference No	BAT Conclusion Requirements	How this will be addressed by proposed changes
		the current site procedures an agreement is in place with an established 3rd party waste management company to assist in the management of waste and identifying improvements.
5.2.1.1.3	The following parameters should be assessed for wastewater streams, unless the parameter can be scientifically seen as irrelevant: volume per batch, batches per year, volume per day, volume per year, COD or TOC, BOD5, pH, bioeliminability, biological inhibition (including nitrification), AOX, CHCs, solvents, heavy metals, total N, total P, chloride, bromide, $SO_4{}^{2-}$, residual toxicity.	It is anticipated the composition of the wastewater streams will be consistent with effluents currently generated, therefore it is not proposed to amend the currently monitoring schedule for waste waters undertaken to comply with contractual and regulatory obligations in relation to the Duty of Care requirements and compliance with the Trade Effluent Consent.
5.2.1.1.4	For emissions to air, the emission profile which reflects the operational mode of the production process should be monitored.	Consistent with current operations, VOCs will be the primary emissions associated with this process. These comprise methylene dichloride, ethanol and acetonitrile. These will be monitored as required by the permit, for example quarterly manual monitoring for Class A and Class B VOCs. On this basis, no change is proposed to the monitoring schedule currently included in the Environmental Permit.
5.2.1.1.4	In the case of a non-oxidative abatement/recovery system where exhaust gases from various processes are treated in a central recovery/ abatement system, continuous monitoring should be implemented.	Continuous monitoring of VOCs is not currently proposed as it is considered that the current requirements for emissions monitoring is appropriate.
5.2.1.1.4	Substances with ecotoxicological potential should be individually monitored if they are released.	Review of the emissions summary, raw and intermediary raw materials confirm that under normal operating conditions, substances that may be released to the environment will not be ecotoxic, and therefore are not required to be monitored. The design of site infrastructure and containment arrangements will prevent the release of ecotoxic substances to the environment.
5.2.1.1.5	Individual exhaust gas volume flows from process equipment to recovery/ abatement systems should be assessed.	The single exhaust from the new process will be monitored for gas volume flow.
	5.2.2 Re-use of solvents	
5.2.2	Solvents should be re-used as far as purity requirements allow by using the following techniques: using the solvent from previous batches of a production campaign for future batches as far as purity requirements allow; collecting spent solvents for on-site or off-site purification and re-use; collecting spent solvents for on-site or off-site utilisation of the calorific value.	Purity requirements for solvents to be recycled have been confirmed. Recycling/reuse is inherent in the design of the new process. Where the recovered solvent is not of a quality to be used within the process it will be sent off site for third party recovery to enable reuse on site or alternative recovery options.
	5.2.3 Treatment of exhaust gases	
5.2.3.1.1	VOC recovery and abatement techniques should be selected in accordance with the flow scheme shown in Figure 5.1 of the BREF document.	VOC recovery and abatement techniques are inherent in the design of the new process, these are broadly

BAT reference No	BAT Conclusion Requirements	How this will be addressed by proposed changes
		compliant with the BAT requirements outlined in the BREF document.
5.2.3.1.2	BAT is to reduce emissions to the levels below where non-oxidative VOC recovery or abatement techniques are applied. Total organic C 0.1 kg C/hour or 20 mg C/m^3** ** The concentration level relates to volume flows without dilution by, e.g. volume flows from room or building ventilation.	Table S3.1 in the permit contains a limit for emission point A1/3 for Total Class A and B Volatile Organic Compounds (expressed as carbon) of 10 kg C/hour.
5.2.3.1.3	BAT is to reduce VOC emissions to the levels given below where thermal oxidation/incineration or catalytic oxidation are applied. Total organic C <0.05 kg C/hour or <5 mg C/m^3	These processes are not undertaken at the installation and are not associated with the project therefore this requirement does not apply.
5.2.3.2.1	For thermal oxidation/incineration or catalytic oxidation, BAT is to achieve the NOX emission levels given below and, where necessary, to apply a DeNOX system (e.g. SCR or SNCR) or two stage combustion to achieve such levels. Thermal oxidation/incineration, catalytic oxidation 0.1 – 0.3kg/hour 13 – 50 mg/m^3 Thermal oxidation/incineration, catalytic oxidation, input of nitrogenous organic compounds 25 – 150 mg/m^3	These processes are not undertaken at the installation and are not associated with the project therefore this requirement does not apply.
5.2.3.2.2	For exhaust gases from chemical production processes, BAT is to achieve the NO_X emission levels given below and, where necessary to apply treatment techniques such as scrubbing or scrubber cascades with scrubber media such as H_2O and/or H_2O_2 to achieve such levels. Chemical production processes, e.g. nitration, recovery of spent acids 0.03 – 1.7 kg/hour 7-220 mg/m^3	Table S3.1 in the permit contains a limit for NOx of 200 mg/m^3. The proposed varied process will not generate additional NOx.
5.2.3.3	Facilities should aim to achieve HCl emission levels of 0.2 – 7.5 mg/m^3 or 0.001 – 0.08 kg/hour and, where necessary, apply of one or more scrubbers using scrubbing media such as H_2O or NaOH in order to achieve such levels.	Wet scrubbing comprising a two-stage alkaline scrubber will be used thus preventing the emission of HCl. The current environmental permit has a limit of 5 mg/m^3 within the BAT emission level range and is tested annually. The proposed varied process will not generate additional HCl.
5.2.3.3	Facilities should aim to achieve Cl_2 emission levels of 0.1 – 1 mg/m^3 and, where necessary, apply techniques such as absorption of the excess chlorine and/or scrubbing with scrubbing media such as $NaHSO_3$ in order to achieve such levels.	Wet scrubbing using a two-stage alkaline scrubber will be used thus preventing the emission of Cl_2. The proposed varied process will not generate additional Cl_2.
5.2.3.3	Facilities should aim to achieve HBr emission levels <1 mg/m^3 and, where necessary, apply scrubbing with scrubbing media such as H_2O or NaOH in order to achieve such levels.	Wet scrubbing using a two-stage alkaline scrubber will be used thus preventing the emission of HBr. The proposed varied LC9000 process will not generate HBr. However, Note 1 in Table S3.1 of the environmental permit details that before using any HBr, the site must agree an emission limit. This variation includes a process change that uses HBr as a raw material and Lianhetech

BAT reference No	BAT Conclusion Requirements	How this will be addressed by proposed changes
		have proposed a limit for blowdown operations from the raw material delivery system in the permit application. This is referred to in the application in the schedule 3 improvement section.
5.2.3.4.1	BAT is to achieve NH_3 emission levels of 0.1 – 10 mg/m^3 or 0.001 – 0.1 kg/hour and, where necessary, to apply scrubbing with scrubbing media such as H_2O or acid in order to achieve such levels	The current environmental permit has a limit of 10 mg/m^3 within the BAT emission level range and is tested annually. The proposed varied process will not generate NH_3.
5.2.3.4.2	BAT is to achieve NH_3 slip levels from SCR or SNCR of	The proposed varied process will not generate NH_3.
5.2.3.5	BAT is to achieve SOx emission levels of 1 – 15 mg/m$_3$ or 0.001 – 0.1 kg/hour and, where necessary, to apply scrubbing with scrubbing media such as H_2O or NaOH in order to achieve such levels	Table S3.1 in the permit contains a limit for SOx of 10 mg/m^3. The proposed varied process will not generate additional SOx.
5.2.3.6	BAT is to achieve particulate emission levels of 0.05 – 5 mg/m^3 or 0.001 – 0.1 kg/hour and, where necessary, to apply techniques such as bag filters, fabric filters, cyclones, scrubbing, or wet electrostatic precipitation (WESP) in order to achieve such levels	Particulate emissions will not be generated through the reactions and the wet scrubber would remove any residual particulate matter.
5.2.3.7	BAT is to remove free cyanides from exhaust gases, and to achieve a waste gas emission level of 1 mg/m^3 or 3 g/hour as HCN	HCN will not be generated in the varied process, therefore this requirement is not applicable.
	5.2.4 Management and treatment of wastewater streams	
5.2.4.1.1	Mother liquors from halogenations and sulphochlorinations should be segregated and pre-treated or disposed of.	Waste liquors containing halogens and sulphochlorines that cannot be reused within the process will be collected and sent to the adjacent incinerator for disposal.
5.2.4.1.2	BAT is to pre-treat wastewater streams containing biologically active substances at levels which could pose a risk either to a subsequent wastewater treatment or to the receiving environment after discharge.	Not applicable. Biologically active processes will not be generated by this process.
5.2.4.1.3	BAT is to segregate and collect separately spent acids, e.g. from sulphonations or nitrations for on-site or off-site recovery or to apply BAT.	Not applicable. Waste acids will not be generated by this process.
5.2.4.2.1	For the purposes of pre-treatment, BAT is to classify organic loading as follows: Refractory organic loading is not relevant if the wastewater stream shows a bioeliminability of greater than about 80 – 90 %. In cases with lower bioeliminability, the refractory organic loading is not relevant if it is lower than the range of about 7.5 – 40 kg TOC per batch or per day	The chemical characteristics of the liquid effluents generated will be consistent with those currently characterised to meet contractual and regulatory requirements Duty of Care and Trade Effluent Consent).
5.2.4.2.2	BAT is to segregate and pre-treat wastewater streams containing relevant refractory organic loadings.	Treatment of effluent streams is not undertaken at the site. It is not proposed to pre-treat effluents generated.
5.2.4.2.3	For the segregated wastewater streams carrying a relevant refractory organic load according to Section 5.2.4.2.1, BAT is to achieve overall COD elimination rates	Not applicable. Effluents are not treated at the installation and there are no proposals to undertake effluent treatment as part of this project.

BAT reference No	BAT Conclusion Requirements	How this will be addressed by proposed changes
	for the combination of pre-treatment and biological treatment of >95 %.	
5.2.4.3	If the costs for biological treatment and purchase of fresh solvents are higher than the costs for recovery and purification, solvents should be recovered from wastewater streams for on-site or off-site reuse using one or a combination of stripping, distillation/rectification and extraction.	The primary route for waste solvents is recovery and reuse. If solvents can't be reused on site, they will be collected and exported to off-site third parties for recovery. Entrained solvent in wastewater will be treated at the Northumbrian Water wastewater treatment works (Bran Sands).
5.2.4.3	If the energy balance shows that overall natural fuel can be substituted then solvents should be recovered from waste water streams to use the calorific value.	The primary route for waste solvents is recovery and reuse, if they can't be reused on site, they will be collected and exported to offsite third parties for recovery or incineration at the adjacent incinerator.
5.2.4.4.1	Purgeable chlorinated hydrocarbons (CHCs) show ecotoxicological potential and are being substituted as solvents where technically possible. Where CHCs are still in use, all efforts are undertaken to remove such compounds from wastewater streams.	Not applicable. CHCs will not be used.
5.2.4.4.2	BAT is to pre-treat wastewater streams with significant AOX loads and to achieve the AOX levels to 0.5 – 8.5mg/l in the inlet to the on-site biological WWTP or in the inlet to the municipal sewerage system	There is no treatment of effluents at the installation and there are no proposals associated with the project to do so.
5.2.4.5	BAT is to pre-treat wastewater streams containing significant levels of heavy metals or heavy metal compounds from processes where they are used deliberately and to achieve the heavy metal concentrations below in the inlet to the on-site biological WWTP or in the inlet to the municipal sewerage system. Cu 0.03-0.4 mg/l Cr 0.04-0.3 mg/l Ni 0.03-0.3 mg/l Zn 0.1-0.5 mg/l	There is no treatment of effluents at the installation and there are no proposals associated with the project to do so.
5.2.4.6	BAT is to: a) pre-treat wastewater streams containing significant loads of cyanides and to achieve a cyanide level of 1 mg/l or lower in the treated wastewater stream or to b) enable safe degradation in a biological WWTP	Not applicable. Wastewater streams containing cyanides will not be generated.
5.2.4.7	After the application of BAT given in Sections 5.2.4.1, 5.2.4.2, 5.2.4.3, 5.2.4.4 and 5.2.4.5 of the Bref document (management and treatment of wastewater streams), BAT is to treat effluents containing a relevant organic load, such as wastewater streams from production processes, rinsing and cleaning water, in a biological WWTP	There is no treatment of effluents at the installation and there are no proposals associated with the project to do so.
5.2.4.7.1	It should be ensured for joint wastewater treatment that the elimination is not poorer than in the case of on-site treatment. This is realised by regular degradability/ bioeliminability testing.	There is no treatment of effluents at the installation and there are no proposals associated with the project to do so.

BAT reference No	BAT Conclusion Requirements	How this will be addressed by proposed changes
5.2.4.7.2	Facilities should take full advantage of the biological degradation potential of the total effluent and achieve BOD elimination rates above 99 % and yearly average BOD emission levels of 1 – 18 mg/l. The levels relate to the effluent after biological treatment without dilution, e.g. by mixing with cooling water.	Not applicable. There is no treatment of effluents at the installation and there are no proposals associated with the project to do so.
5.2.4.8	Facilities should aim to achieve the emission levels given in Table 5.8 of the BREF document for the following parameters: COD, total P, inorganic N, AOX, Cu, Cr, Ni, Zn, suspended solids, LID_F, LID_D, LID_A, LID_L, LID_{EU},	Not applicable. There is no treatment of effluents at the installation and there are no proposals associated with the project to do so.
5.2.4.8	The total effluent to and from the biological WWTP should be regularly monitored, measuring at least the following parameters: volume per batch, batches per year, volume per day, volume per year, COD or TOC, BOD5, pH, bioeliminability, biological inhibition (including nitrification), AOX, CHCs, solvents, heavy metals, total N, total P, chloride, bromide, SO_4^{2-}, residual toxicity.	There is no treatment of effluents at the installation and there are no proposals associated with the project to do so.
5.2.4.8.1	BAT is to carry out regular biomonitoring of the total effluent after the biological WWTP where substances with ecotoxicological potential are handled or produced with or without intention.	There is no treatment of effluents at the installation and there are no proposals associated with the project to do so.
5.2.4.8.2	BAT is to apply online toxicity monitoring in combination with online TOC measurement if residual acute toxicity is identified as a concern.	All liquid effluents are collected in storage tanks and sent off-site as part of the waste disposed from the installation. As part of the duty of care the waste is tested and characterised against Guidance on the classification and assessment of waste (1st Edition v1.1.GB)Technical Guidance WM3. This assessment showed that the waste produced has hazardous properties HP3 (flammable) and HP8 (corrosive) but not HP6 (acute toxicity). These analyses are provided to the waste treatment facility as part of waste acceptance procedures.
	5.3 ENVIRONMENTAL MANAGEMENT	
5.3	Facilities should implement and adhere to an Environmental Management System (EMS) that incorporates, as appropriate to individual circumstances: definition of an environmental policy for the installation by top management; establishing and implementing the necessary procedures; checking performance and taking corrective action; review by top management; having the management system and audit procedure examined and validated by an accredited certification body or an external EMS verifier; preparation and publication of a regular environmental statement describing all the significant environmental aspects of the installation; implementation and adherence to an internationally accepted voluntary system such as EMAS and EN ISO 14001:1996. A full list of features to be included in the EMS is provided in section 5.3 of the BREF document.	Lianhetech has an environmental management system which is certified to ISO 14001 2015. Certificate No GB09/77969, valid until 09/02/2024 issued by SGS.

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