

Action 1 Response

Report reference Report ID: BV4673IM/0442767

ACTION 01. Provide a gap assessment or equivalent report demonstrating how existing VOC levels & other applicable pollutants have been identified and how they compare against the new BAT-AELs. Please include company considerations and ongoing plans demonstrating all steps you will undertake to become compliant with all BAT Conclusion requirements and 'Chemical waste: appropriate measures for permitted facilities and in what timeframe.

Deadline: 31st January 2023

Please provide a summary and submit to the Environment Agency for review.

Report.

A Regulation 61 information request was provided to EA March 2022 also copied to local office. This covers information required by the EA to draft the revised Permit following issue of EU Waste Treatment BREF.

The covers site detail and relevant waste treatment appropriate measures (regeneration of solvents).

Relevant BAT Conclusion Requirements

BAT Ref	Description	Test / Task	Rationale	Comments
BAT 4 BAT 45	Monitoring of channelled emissions to air.	TVOC	The BAT-AEL does not apply when the emission load is below 2 kg/h at the emission point provided that no CMR substances are identified as relevant in the waste gas stream, based on the inventory mentioned in BAT 3.	All tanks containing dangerous substances vented to a single collection duct and then onto scrubber. Plants Vent directly to scrubber system. This is discussed later in report.

<p>BAT 4 BAT 47</p>	<p>Monitoring of channelled emissions to air.</p>	<p>TVOC</p>	<p>In order to prevent or, where that is not practicable, to reduce VOC emissions to air, BAT is to use a suitable combination of the techniques Adsorption, Thermal oxidation, Wet scrubber. Condensation.</p>	<p>Combination of condensing and wet scrubbing applied which can be considered BAT. Adsorption using carbon presents a fire risk with some solvent VOC types.</p>
<p>BAT 14</p>	<p>Prevent or, where that is not practicable, to reduce diffuse emissions to air.</p>	<p>Minimising the number of potential diffuse emissions sources</p>	<p>Generally Applicable This includes techniques such as: <ul style="list-style-type: none"> · appropriate design of piping layout (e.g., minimising pipe run length, reducing the number of flanges and valves, using welded fittings and pipes); · favouring the use of gravity transfer rather than using pumps; </p>	<p>Piping design balances the need for minimising pipe runs vs risk of contamination or miss-direction of materials. Pipe runs run across containment areas where they are not directly adjacent to walkways but are easily to access and inspect. Pipes are welded at bends and to make lengths off site which then can be manhandled into place on site and then joined by high integrity gaskets. All pipework is pressure tested before being brought into service. Dry break coupling Sample points with extraction Gravity transfer applied on difficult to pump streams.</p>
		<p>Select and use high integrity equipment</p>	<p>Generally Applicable <ul style="list-style-type: none"> •Valves with double packing seals •high integrity gaskets •Pumps / compressors / agitators with mechanical seals •magnetically driven pumps/compressors/agitators </p>	<p>Main production and ROSOV valves are double sealed (Company standard) high integrity gaskets used on pipework. Pumps have mechanical seals Due to nature of many materials processed with low solids content and high volumes, it is not practical to use magnetically driven pumps;</p>

		Select appropriate material for equipment	Generally adopted Tradebe Standards etc. Appropriate selection of construction material...	Materials specified for primary containment fully compatible with materials processed (Generally Stainless steel).
		Ensure containment, collection and treatment of diffuse emissions	Generally Applicable <ul style="list-style-type: none"> •Collecting and directing the emissions to an appropriate abatement system •IBC and drum decanting 	All tanks containing dangerous substances vented to a single collection duct and then onto scrubber. Plants Vent directly to scrubber system. IBC and drum decanting is small scale and carried out outdoors in well ventilated areas

FROM BREF (Best Available Techniques (BAT) Reference Document for Waste Treatment)

6.1 General BAT conclusions

6.1.1 Overall environmental performance

BAT Ref	Requirement	Current site status	AM Applied
1	In order to improve the overall environmental performance, BAT is to implement and adhere to an environmental management system (EMS) that incorporates all of the following features: Etc	IMS Accredited Company covering; ISO 9001 ISO 14001 ISO45001	Yes
2.	Set up and implement waste characterisation and pre-acceptance procedures	Pre-acceptance fully implemented in line with BAT Requirements referenced in epr S05.06. Tradebe Procedure 134. Material Technical Assessments.	Yes
	Set up and implement waste acceptance procedures	Acceptance fully implemented in line with BAT Requirements referenced in epr S05.06. Tradebe Procedure 140. Site (pre) Acceptance. Waste cannot be accepted on site until SAP system 'unlocked' through acceptance system.	Yes

	Set up and implement a waste tracking system and inventory	Waste inventory is managed in a batch to batch/day to day recording system. Waste throughputs are fully tracked with systems allowing full visibility of stock levels and stock ages.	Yes
	Set up and implement an output quality management system	Quality Management system includes traceability, training, competence and controlled material specifications within SAP supported by ISO9001 accreditation	Yes
	Ensure waste segregation	Waste segregation by designated tank storage.	Yes
	Ensure waste compatibility prior to mixing or blending of waste	All waste in tested to a specification. No mixing or blending of wastes	Yes
	Sort incoming solid waste	No solid waste input	N/a
3	In order to facilitate the reduction of emissions to water and air, BAT is to establish and to maintain an inventory of waste water and waste gas streams,	Waste water from processing is tested to control parameters. This is determined from pre-application work. Components in waste gas streams are linked to waste streams on site	Yes
In order to reduce the environmental risk associated with the storage of waste, BAT is to use all of the techniques given below.			
4	Optimised storage location	Storage locations are compliant with HSG176 such that there are not high levels of material stored in each bunded area and there is adequate segregation between storage areas.	Yes
	Adequate storage capacity	As waste solvents are stored in fixed bulk tanks there is a limit to materials that can be stored. Adequacy of storage is based on mix of solvent streams, and storage time of wastes before processing	Yes
	Safe storage operation	Storage is fully compliant with Guidance HSG176 – Storage of flammable liquids in tanks. Live inventory is available at all	Yes

		times and independent overfill protection is rated to SIL 1 requirements. Bund capacity is always the larger of the 25%/110% rule.	
	Separate area for storage and handling of packaged hazardous waste	Separate drum bays for waste material supplied in 205L metal drums or IBCs. Constructed and operated following Guidance for the storage of liquids in intermediate bulk containers (HSE/SIA) and HSG 51, HSG 71	Yes
5	In order to reduce the environmental risk associated with the handling and transfer of waste, BAT is to set up and implement handling and transfer procedures.	Handling and transfer procedures in place as a series of Operational Task instructions. These are step by step guides, have been subject to Safety Critical Task Assessment and have been rolled out to all Operational staff with evidenced assessments.	Yes
6	BAT is to monitor key process parameters	Key process parameters are detailed in processing instructions and recorded. All parameters are continuously monitored and trended by PLC system. Basic process controls provide alarms when running against process operational 'envelope'. Safety critical controls alarm and take shut down actions when running against the process safety 'envelope'.	Yes
9	BAT is to monitor diffuse emissions of organic compounds to air from the regeneration of spent solvents,	Currently pipework integrity checking (periodic and detailed), Plant care checks (regular and thorough) and Shift Manager walkround checks (frequent and basic)	Yes
10	BAT is to periodically monitor odour emissions.	Pre-application process assesses odour potential of waste streams. Materials accepted generally low/moderate in terms of odour and odours limited to areas on site.	Yes

		No reports of off-site odours and no need previously for an odour management plan	
11	BAT is to monitor the annual consumption of water, energy and raw materials as well as the annual generation of residues and waste water, with a frequency of at least once per year.	All parameters identified are monitored at least monthly and reported to EA at least annually. Tradebe has duty also to report these indicators under Corporate Sustainably Reporting. These are audited by a third party.	Yes
12	In order to prevent or, where that is not practicable, to reduce odour emissions,	Pre-application process assesses odour potential of waste streams. Materials accepted generally low/moderate in terms of odour and odours limited to areas on site. No reports of off site odours and no need previously for an odour management plan	N/A
In order to prevent or, where that is not practicable, to reduce diffuse emissions to air, in particular of dust, organic compounds and odour, BAT is to use an appropriate combination of the techniques given below.			
14	Minimising the number of potential diffuse emission sources	All tanks containing dangerous substances vented to a single collection duct and then onto scrubber. Plants Vent directly to scrubber system.	Yes
	Selection and use of high-integrity equipment	Equipment for moving solvents – i.e. pumps – are classed as having suitable integrity for use in an ATEX, Explosive atmosphere environment. This is defined as having suitable rating in terms of containment, temperature of operation and electrical safety.	Yes
	Corrosion prevention	All primary containment is constructed of materials resistant to on site solvents (generally stainless steel). There is a programme of assess integrity checks to check containment for	Yes

		potential areas of corrosion or erosion.	
	Containment, collection and treatment of diffuse emissions	All tanks containing dangerous substances vented to a single collection duct and then onto scrubber. Plants Vent directly to scrubber system.	Yes
	Dampening	N/A No Relevant Solids	Yes
	Maintenance	Plant is under Computerised maintenance management system to deliver planned preventative maintenance. System covers asset integrity, maintenance of safety critical equipment, Instrument functional safety and electrical safety.	Yes
	Cleaning of waste treatment and storage areas	Site is subject to a number of housekeeping initiatives from 'clean as you go' through to organised housekeeping areas supported by daily targeted management inspections.	Yes
	Leak detection and repair (LDAR) programme	Currently pipework integrity checking (periodic and detailed), Plant care checks (regular and thorough) and Shift Manager walkround checks (frequent and basic)	Yes
BAT conclusions for the regeneration of spent solvents. Emissions to air			
47	<p>In order to reduce emissions of organic compounds to air, BAT is to apply BAT 14d and to use a combination of the techniques given below;</p> <ul style="list-style-type: none"> • Recirculation of process • off-gases in a steam boiler • Adsorption • Thermal oxidation • Condensation or cryogenic condensation • Wet scrubbing 	Site currently uses a combination of condensation and wet scrubbing which can be considered BAT.	Yes

Further discussion on BAT 3 and BAT 47.

BAT 3. An inventory of all materials processed is maintained along with off-gas and waste water. This is used for waste recovery options, costings, site and business risks along with protection of staff health under COSHH. It has been identified that there are CMR substances in TSR inventory.

BAT47. Emission Limits. I.e., The BAT-AEL does not apply when the emission load is below 2 kg/h at the emission point provided that no CMR substances are identified as relevant in the waste gas stream, based on the inventory mentioned in BAT 3.

- a) An initial options appraisal has suggested that whilst most abatement options are applicable (Adsorption, scrubbing, cryocondensing) the available infrastructure and required services suggests Thermal oxidation or VOC destruction within Boilers would tend to be the preferred option at site.
- b) Monitoring of boiler 3 has shown that this boiler is burning PGD fuel efficiently and emissions are very low in VOCs.
- c) Boiler burner service company (Saacke) has said they could potentially consider reintroduction of VOC stream back to the boilers. They have a number of boilers operating around the UK where this is happening and would look at burner design to accommodate what we need units to handle.
- d) Design review and Process Hazard Analysis currently underway with multidisciplinary team"
- e) Modelling of VOCs released from Scrubber stack has shown that the impact of site emission is not significant.

BAT Discussion.

At this stage it is not felt to be the correct approach to jump straight to abatement without looking at the other aspects of BAT and looking at where we can best control emissions overall. Currently the abatement solution would be oversized and having to deal with a very variable load and we would be recovering the energy from solvent rather than allowing the solvent to be recovered.

In terms of BAT the correct approach should be recovering VOCs (Solvent) as close to source as possible to maximise recovery.

For new projects this has been part of the project definition from the start. E.g., for the DEE project Tanks will be lagged to minimise heat effects, the barrel transfers will be backvented back to tank and VOC emissions will go via a condenser before entering VOC common header.

Changes to the existing MEF tank installation can be seen as an opportunity to apply BAT and recover solvent in line with DEE model.

Additional chilled cooling is to be applied across all guard condensers as Part of the S4 projects on site. This could also be considered on exit from scrubber system to further minimise emissions.

Scrubber management also to be reviewed and improved to ensure good practice is applied (i.e., temperature/pH control).

Segregation of emissions from CMR materials not seen as practicable due to the flexibility required in storage and in processing.

In summary. We can demonstrate site has no significant impact, we have considered BAT and have identified a programme of improvements – but in parallel we are working to have a full understanding of issues in costs in meeting the BAT-AELs if applied.

Sector Relevant Appropriate Measures

6. Emissions control appropriate measures (AM)

These are the appropriate measures for emissions control at regulated facilities with an environmental permit for treating or transferring chemical waste.

6.1. Point source emissions to air,

Ref	Requirement	Current site status	AM Applied
1	You must contain storage tanks, silos and waste treatment plant (including shredders) to make sure you collect, extract and direct all process emissions to an appropriate abatement system for treatment before release.	All materials fully contained and transferred where practicable in fixed lines to storage tanks. All tanks breath to a common VOC header via a pressure/vacuum line and then on to wet scrubber. All plants breath to wet scrubber for treatment before release.	Y
2	You must identify the main chemical constituents of the site's point source emissions as part of the site's inventory of emissions to air.	Main chemical constituents identified by site inputs and inventory.	Y
3	You must assess the fate and impact of the substances emitted to air, following the Environment Agency's risk assessment methodology.	Dispersion modelling report (Socotec 2021) confirms no significant impact. Copied to EA.	Y
4	To reduce point source emissions to air (for example, dust, volatile organic compounds and odour) from the treatment of waste, you must use an appropriate combination of abatement techniques, including one or more of the following systems: <ul style="list-style-type: none"> • adsorption (for example, activated carbon) • biofiltration • wet scrubbing • fabric filters • high efficiency particulate (HEPA) filtration 	A combination of condensation and wet scrubbing is used.	Y

	<ul style="list-style-type: none"> condensation and cryogenic condensation cyclonic separation electrostatic precipitation thermal oxidation 		
5	You must assess and design vent and stack locations and heights to make sure dispersion capability is adequate. Where monitoring is required, including for odour, you must install suitable monitoring points.	Compliant monitoring points installed in scrubber stack. Dispersion modelling report (Socotec 2021) confirms no significant impact.	Y
6	<p>Your procedures must make sure you correctly install, operate, monitor and maintain abatement equipment. For example, this includes monitoring and maintaining:</p> <ul style="list-style-type: none"> appropriate flow and chemical concentration of scrubber liquor the handling and disposal or regeneration of spent scrubber or filter medium 	<p>Current scrubber has flow indication and a low flow (and low pressure) alarm. The scrubber vessel also has High- and low-level alarms.</p> <p>These are alarms are linked via the PLC system to Plant overview pages in Control Room.</p> <p>Liquor concentration is tested in in process lab each 12-hour shift and liquor changed out at threshold of 5%organics. Spent liquor is routed to our Hi COD tanks for testing and routing to external biological treatment plant.</p>	Y
7	You should design and operate abatement systems to minimise water vapour plumes.	No vapour plume visible from stack under all normal circumstances	Y