CSG Avonmouth BAT Conclusions Assessment
CSG 1205A

Introduction

This assessment is carried out for the proposed waste treatment facility at CSG Avonmouth against the BAT conclusions for treatment of waste oil and treatment of water-based liquid waste, as requested by the Environment Agency.

This assessment covers the proposed 5.3 A(1)(a)(ii), 5.4 A(1)(a)(ii) and 5.6 A(1)(a) activities.

Section 1 – General BAT

BAT 1 ***In order to improve the overall environmental performance, BAT is to implement and adhere to an environmental management system (EMS)***

The proposed system falls under the site's EMS, which is operated under CSG policies and procedures which are certified to ISO 14001:2015. Suitable noise and odour assessments have been carried out.

It is considered that CSG Avonmouth meets BAT 1.

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

Technique		Description
a.	Set up and implement waste characterisation and pre-acceptance procedures	These procedures aim to ensure the technical (and legal) suitability of waste treatment operations for a particular waste prior to the arrival of the waste at the plant. They include procedures to collect information about the waste input and may include waste sampling and characterisation to achieve sufficient knowledge of the waste composition. Waste pre-acceptance procedures are risk-based considering, for example, the hazardous properties of the waste, the risks posed by the waste in terms of process safety, occupational safety and environmental impact, as well as the information provided by the previous waste holder(s).
b.	Set up and implement waste	Acceptance procedures aim to confirm the

	acceptance procedures	characteristics of the waste, as identified in the pre-acceptance stage. These procedures define the elements to be verified upon the arrival of the waste at the plant as well as the waste acceptance and rejection criteria. They may include waste sampling, inspection and analysis. Waste acceptance procedures are risk-based considering, for example, the hazardous properties of the waste, the risks posed by the waste in terms of process safety, occupational safety and environmental impact, as well as the information provided by the previous waste holder(s).
c.	Set up and implement a waste tracking system and inventory	A waste tracking system and inventory aim to track the location and quantity of waste in the plant. It holds all the information generated during waste pre-acceptance procedures (e.g. date of arrival at the plant and unique reference number of the waste, information on the previous waste holder(s), pre-acceptance and acceptance analysis results, intended treatment route, nature and quantity of the waste held on site including all identified hazards), acceptance, storage, treatment and/or transfer off site. The waste tracking system is risk-based considering, for example, the hazardous properties of the waste, the risks posed by the waste in terms of process safety, occupational safety and environmental impact, as well as the information provided by the previous waste holder(s).
d.	Set up and implement an output quality	This technique involves setting up and implementing an output

	management system	quality management system, so as to ensure that the output of the waste treatment is in line with the expectations, using for example existing EN standards. This management system also allows the performance of the waste treatment to be monitored and optimised, and for this purpose may include a material flow analysis of relevant components throughout the waste treatment. The use of a material flow analysis is risk-based considering, for example, the hazardous properties of the waste, the risks posed by the waste in terms of process safety, occupational safety and environmental impact, as well as the information provided by the previous waste holder(s).
e.	Ensure waste segregation	Waste is kept separated depending on its properties in order to enable easier and environmentally safer storage and treatment. Waste segregation relies on the physical separation of waste and on procedures that identify when and where wastes are stored.
f.	Ensure waste compatibility prior to mixing or blending of waste	Compatibility is ensured by a set of verification measures and tests in order to detect any unwanted and/or potentially dangerous chemical reactions between wastes (e.g. polymerisation, gas evolution, exothermal reaction, decomposition, crystallisation, precipitation) when mixing, blending or carrying out other treatment operations. The compatibility tests are risk-based considering, for example, the hazardous properties of the waste, the risks posed by the

		waste in terms of process safety, occupational safety and environmental impact, as well as the information provided by the previous waste holder(s).
g.	Sort incoming solid waste	Sorting of incoming solid waste [10] aims to prevent unwanted material from entering subsequent waste treatment process(es). It may include: —manual separation by means of visual examinations; —ferrous metals, non-ferrous metals or all-metals separation; —optical separation, e.g. by near-infrared spectroscopy or X-ray systems; —density separation, e.g. by air classification, sink-float tanks, vibration tables; —size separation by screening/sieving.

The proposed site follows CSG Bristol's EMS, which is operated under CSG policies and procedures which are certified to ISO 14001:2015. This involves waste pre-acceptance and acceptance procedures, tracking system, output monitoring, suitable onsite storage and segregation, and waste compatibility testing (where appropriate). Waste characterisation and acceptance is carried out by a qualified chemist. CSG Bristol operates with a compliance rating of 'A' and it is our intention that Avonmouth will operate to the same high standards but with better infrastructure.
All points a-f are appropriately carried out. Where site accepts solid waste (as per g. above), manual separation is carried out as required.
It is considered that CSG Avonmouth meets BAT 2.

BAT 3 ***In order to facilitate the reduction of emissions to water and air, BAT is to establish and to maintain an inventory of waste water and waste gas streams, as part of the environmental management system***
The variety of wastes accepted onto site will be limited; as such, all waste has been fully characterised and emissions are well known. New wastes undergo pre-acceptance and acceptance sampling to ensure they are suitable for treatment and any unacceptable emissions can be abated/avoided.
It is considered that CSG Avonmouth meets BAT 3.

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

Technique		Description	Applicability
a.	Optimised storage location	This includes techniques such as: —the storage is located as far as technically and economically possible from sensitive receptors, watercourses, etc.; —the storage is located in such a way so as to eliminate or minimise the unnecessary handling of wastes within the plant (e.g. the same wastes are handled twice or more or the transport distances on site are unnecessarily long).	Generally applicable to new plants.
b.	Adequate storage capacity	Measures are taken to avoid accumulation of waste, such as: —the maximum waste storage capacity is clearly established and not exceeded taking into account the characteristics of the wastes (e.g. regarding the risk of fire) and the treatment capacity; —the quantity of waste stored is regularly monitored against the maximum allowed storage capacity; —the maximum residence time of waste is clearly established.	Generally applicable.
c.	Safe storage operation	This includes measures such as: —equipment used for loading,	

		unloading and storing waste is clearly documented and labelled; —wastes known to be sensitive to heat, light, air, water, etc. are protected from such ambient conditions; —containers and drums are fit for purpose and stored securely.	
d.	Separate area for storage and handling of packaged hazardous waste	When relevant, a dedicated area is used for storage and handling of packaged hazardous waste.	

CSG Avonmouth has been designed to ensure waste is stored and treated as safely and efficiently as possible. The tank farm has a clear storage capacity, and site procedures are clear and concise in terms of waste storage and segregation.
It is considered that CSG Avonmouth meets BAT 4.

BAT 5 ***In order to reduce the environmental risk associated with the handling and transfer of waste, BAT is to set up and implement handling and transfer procedures***
Transfer and handling procedures are based on those currently in place at CSG Bristol, which this proposed facility will replace.
It is considered that CSG Avonmouth meets BAT 5.

BAT 6 ***For relevant emissions to water as identified by the inventory of waste water streams (see BAT 3), BAT is to monitor key process parameters (e.g. waste water flow, pH, temperature, conductivity, BOD) at key locations (e.g. at the inlet and/or outlet of the pretreatment, at the inlet to the final treatment, at the point where the emission leaves the installation)***
Relevant monitoring will be carried out as required. Please see the accompanying H1 assessment for an inventory of emissions.
It is considered that CSG Avonmouth meets BAT 6.

BAT 7 ***BAT is to monitor emissions to water with at least the frequency given below, and in accordance with EN standards. If EN standards are not available, BAT is to use ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality.***
Based on operations at CSG Bristol, CSG Avonmouth will have a very good level of compliance with its discharge consent, however we check the current concentrations of parameters with strip test kits and a spectrophotometer. To test against the BAT -AELS we have had to rely on composite samples of effluent being externally analysed. A new spectrophotometer is on order which will be able to quickly analyse incoming wastes and effluent to ensure compliance with the discharge consent and BAT-AEL levels. These results will be confirmed using UKAS accredited laboratories on composite samples of effluent.

The external analysis undertaken on composite samples for relevant BAT-AELs indicates the discharges to sewer fall below BAT-AEL levels for metals that are not removed by the UWWTW.

BAT 8 ***BAT is to monitor channelled emissions to air with at least the frequency given below, and in accordance with EN standards. If EN standards are not available, BAT is to use ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality.***
CSG Avonmouth will monitor TVOC's to air on a six monthly basis in line with BAT 53.
It is considered that CSG Avonmouth meets BAT 8.

BAT 9 ***BAT is to monitor diffuse emissions of organic compounds to air from the regeneration of spent solvents, the decontamination of equipment containing POPs with solvents, and the physico-chemical treatment of solvents for the recovery of their calorific value, at least once per year using one or a combination of the techniques given below***
Not applicable as the site does not accept or regenerate spent solvents.

BAT 10 ***BAT is to periodically monitor odour emissions***
It is not anticipated that odour will be an issue at site due to the nature of the waste accepted, the containment on site and the techniques employed at site. However, periodic monitoring and inspections will take place.
It is considered that CSG Avonmouth meets BAT 10.

BAT 11 ***BAT is to monitor the annual consumption of water, energy and raw materials as well as the annual generation of residues and waste water, with a frequency of at least once per year***
These will be monitored and reported as part of the site annual report.
It is considered that CSG Avonmouth meets BAT 11.

BAT 12 ***In order to prevent or, where that is not practicable, to reduce odour emissions, BAT is to set up, implement and regularly review an odour management plan, as part of the environmental management system (see BAT 1)***
Please see response to BAT 10.

BAT 13 ***In order to prevent or, where that is not practicable, to reduce odour emissions, BAT is to use one or a combination of the techniques given below.***
Please see the response to BAT 10.

BAT 14 ***In order to prevent or, where that is not practicable, to reduce diffuse emissions to air, in particular of dust, organic compounds and odour, BAT is to use an appropriate combination of the techniques given below***
Depending on the risk posed by the waste in terms of diffuse emissions to air, BAT 14d is especially relevant.
The risk of diffuse emissions is low due to the design of the treatment plant and the techniques employed on site.
In regards, 14d, tank vents are to be enclosed and directed to a single point source emissions, which has been assessed in the accompanying H1 assessment.
It is considered that CSG Avonmouth meets BAT 14.

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

There is no flaring at CSG Avonmouth. Not applicable.

BAT 16 ***In order to reduce emissions to air from flares when flaring is unavoidable, BAT is to use both of the techniques given below.***
There is no flaring at CSG Avonmouth. Not applicable.

BAT 17 ***In order to prevent or, where that is not practicable, to reduce noise and vibration emissions, BAT is to set up, implement and regularly review a noise and vibration management plan, as part of the environmental management system (see BAT 1)***
Noise and/or vibration will not be an issue at CSG Avonmouth due to the lack of sources of noise and sensitive receptors and the design of the treatment plant.

BAT 18 ***In order to prevent or, where that is not practicable, to reduce noise and vibration emissions, BAT is to use one or a combination of the techniques given below.***
See BAT 17 above.

BAT 19 ***In order to optimise water consumption, to reduce the volume of waste water generated and to prevent or, where that is not practicable, to reduce emissions to soil and water, BAT is to use an appropriate combination of the techniques given below***

Technique		Description	Applicability
a.	Water management	Water consumption is optimised by using measures which may include: —water-saving plans (e.g. establishment of water efficiency objectives, flow diagrams and water mass balances); —optimising the use of washing water (e.g. dry cleaning instead of hosing down, using trigger control on all washing equipment); —reducing the use of water for vacuum generation (e.g. use of liquid ring pumps with high boiling point liquids).	Generally applicable.
b.	Water recirculation	Water streams are recirculated within the plant, if necessary after	Generally applicable.

		treatment. The degree of recirculation is limited by the water balance of the plant, the content of impurities (e.g. odorous compounds) and/or the characteristics of the water streams (e.g. nutrient content).	
c.	Impermeable surface	Depending on the risks posed by the waste in terms of soil and/or water contamination, the surface of the whole waste treatment area (e.g. waste reception, handling, storage, treatment and dispatch areas) is made impermeable to the liquids concerned.	Generally applicable.
d.	Techniques to reduce the likelihood and impact of overflows and failures from tanks and vessels	Depending on the risks posed by the liquids contained in tanks and vessels in terms of soil and/or water contamination, this includes techniques such as: —overflow detectors; —overflow pipes that are directed to a contained drainage system (i.e. the relevant secondary containment or another vessel); —tanks for liquids that are located in a suitable secondary containment; the volume is normally sized to accommodate the loss of containment of the largest tank within the secondary containment;	Generally applicable.

		—isolation of tanks, vessels and secondary containment (e.g. closing of valves).	
e.	Roofing of waste storage and treatment areas	Depending on the risks posed by the waste in terms of soil and/or water contamination, waste is stored and treated in covered areas to prevent contact with rainwater and thus minimise the volume of contaminated run-off water.	Applicability may be constrained when high volumes of waste are stored or treated (e.g. mechanical treatment in shredders of metal waste).
f.	Segregation of water streams	Each water stream (e.g. surface run-off water, process water) is collected and treated separately, based on the pollutant content and on the combination of treatment techniques. In particular, uncontaminated waste water streams are segregated from waste water streams that require treatment.	Generally applicable to new plants. Generally applicable to existing plants within the constraints associated with the layout of the water collection system.
g.	Adequate drainage infrastructure	The waste treatment area is connected to drainage infrastructure. Rainwater falling on the treatment and storage areas is collected in the drainage infrastructure along with washing water, occasional spillages, etc. and, depending on the pollutant content, recirculated or sent for further treatment.	Generally applicable to new plants. Generally applicable to existing plants within the constraints associated with the layout of the water drainage system.
h.	Design and maintenance provisions to allow	Regular monitoring for potential leakages is risk-based, and, when necessary,	The use of above-ground components is generally applicable to new

	detection and repair of leaks	equipment is repaired. The use of underground components is minimised. When underground components are used, and depending on the risks posed by the waste contained in those components in terms of soil and/or water contamination, secondary containment of underground components is put in place.	plants. It may be limited however by the risk of freezing. The installation of secondary containment may be limited in the case of existing plants.
i.	Appropriate buffer storage capacity	Appropriate buffer storage capacity is provided for waste water generated during other than normal operating conditions using a risk-based approach (e.g. taking into account the nature of the pollutants, the effects of downstream waste water treatment, and the receiving environment). The discharge of waste water from this buffer storage is only possible after appropriate measures are taken (e.g. monitor, treat, reuse).	Generally applicable to new plants. For existing plants, applicability may be limited by space availability and by the layout of the water collection system.

CSG Avonmouth will employ a number of different techniques to manage water use on site. Water is reused wherever possible, rainwater may be harvested which can be used to wash plant and equipment. The site is concreted, any rainwater falling within the permit area flows to the treatment plant and is checked prior to discharge to sewer – any uncontaminated rainwater falling outside of the permitted area is managed and discharged through an interceptor to surface. Storage tanks and pipework will be regularly checked and maintained to ensure primary containment, and the bunded area will also undergo period checks. The bund has been designed to CIRIA 736 standards.
It is considered that CSG Avonmouth meets BAT 19.

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

Site utilises gravitational settlement aided by chemical flocculation and pH adjustment if necessary. This enables many of the contaminants to be deposited into the sludge, which is sent offsite for further treatment and recovery/disposal as required. As much waste oil is separated as possible.
It is considered that CSG Avonmouth meets BAT 20.

BAT 21 ***In order to prevent or limit the environmental consequences of accidents and incidents, BAT is to use all of the techniques given below, as part of the accident management plan (see BAT 1)***
CSG Avonmouth will incorporate all measures listed under BAT 21 into the accident management plan for the site.

BAT 22 ***In order to use materials efficiently, BAT is to substitute materials with waste***
Generally, product is sought as it is more likely to fall within the required specification. However, if waste of suitable quality is available the site's procedures allow this to be used. A list of wastes that may be used to replace raw materials is given within document B3.1b

BAT 23 ***In order to use energy efficiently, BAT is to use both of the techniques given below***
Energy efficiency measures have been built into the design of the facility. However, detailed efficiency measures and mass balance plans will only be possible when the site is fully operational and CSG can assess the processes.
It is therefore concluded that CSG Avonmouth will require some time after commissioning to be able to put BAT 23 measures in place.

BAT 24 ***In order to reduce the quantity of waste sent for disposal, BAT is to maximise the reuse of packaging, as part of the residues management plan (see BAT 1)***
Packaging is reused wherever possible. IBC's and drums will, where possible, be cleaned allowing these to be reused.
It is considered that CSG Avonmouth meets BAT 24.

The following BAT have been deemed applicable as they relate to waste treatment carried out at CSG Avonmouth. Any BAT not detailed below has been deemed to be not applicable.

<u>Section 4 – Physico-chemical treatment BAT</u>

BAT 45 ***In order to reduce emissions of organic compounds to air, BAT is to apply BAT 14d and to use one or a combination of the techniques given below.***
See BAT 14 above.

<u>Section 5 – Treatment of water-based chemical waste BAT</u>

BAT 52 ***In order to improve the overall environmental performance, BAT is to monitor the waste input as part of the waste pre-acceptance and acceptance procedures (see BAT 2)***
Site will monitor and record all waste pre-acceptance and acceptance sampling for the appropriate determinants.

BAT 53 ***In order to reduce emissions of HCl, NH3 and organic compounds to air, BAT is to apply BAT 14d and to use one or a combination of the techniques given below***
Please see BAT 14 above. Only TVOC's are relevant to CSG Avonmouth.

Appropriate Measures

CSG Avonmouth will meet all relevant appropriate measures for both hazardous and non-hazardous waste treatment and storage.

Conclusion

It is deemed from this assessment that the proposed site and processes meets the requirements of the BAT conclusions for treatment of waste oil and treatment of water based liquid waste.