Best Available Techniques (BAT) review of the process for the neutralisation of hazardous waste and non-hazardous waste to be operated by Augean South Limited at East Northants Resource Management Facility (ENRMF), Stamford Road, Peterborough

1. This review has been prepared based on Environment Agency (EA) guidance *Best available techniques: environmental permits*[1] and the enhanced pre-application advice provided by the EA in a letter dated 23 November 2020.

2. EA technical guidance for regulated industry sectors[2] (the EA technical guidance) identifies that new guidance Chemical waste: appropriate measures for permitted facilities[3] (the EA Appropriate Measures guidance) applies to new chemical waste facilities applying for permits from 18 November 2020.

3. The EA Appropriate Measures guidance states in section 1.2 how appropriate measures should be implemented at new and existing facilities:

> *"For new facilities the appropriate measures must be in place before operations start…*
>
> *Through permit reviews, the Environment Agency will assess the current operating techniques of existing facilities against the relevant appropriate measures."*

4. The EA technical guidance states:

> *"Chemical waste sites that were permitted before 18 November 2020 need to continue to use the Sector Guidance Note S5.06: recovery and disposal of hazardous and non-hazardous waste until their permits are varied".*

The EA guidance for Sector Guidance Note (SGN) S5.06[4] states:

> *"For existing waste installations, operators will need to make sure that the BAT conclusions are met in full by August 2022."*

5. As the waste neutralisation process will use some new plant at an existing waste installation a Best Available Techniques (BAT) review in respect of the waste neutralisation process has been undertaken. The review demonstrates that the waste neutralisation process and directly associated new plant and techniques comprise BAT.

[1] https://www.gov.uk/guidance/best-available-techniques-environmental-permits Last accessed 24 May 2021.
[2] https://www.gov.uk/government/collections/technical-guidance-for-regulated-industry-sectors-environmental-permitting Last accessed 24 May 2021.
[3] https://www.gov.uk/guidance/chemical-waste-appropriate-measures-for-permitted-facilities . Last accessed 24 May 2021.
[4] https://www.gov.uk/government/publications/sector-guidance-note-s506-recovery-and-disposal-of-hazardous-and-non-hazardous-waste Last accessed 24 May 2021.

6. Consistent with the EA Appropriate Measures guidance and the EA guidance for SGN S5.06 it is unnecessary to consider at this point BAT in respect of the existing waste activities, plant and techniques at the site or the proposed changes associated with the waste stabilisation process and the waste solidification/stabilisation process which are limited to an increase in waste throughput.

BAT review of the waste neutralisation process

(i) The waste neutralisation process comprises a physico-chemical waste treatment process. As described in the technical description document (Appendix F) the process comprises the neutralisation of hazardous waste and non-hazardous waste. The BAT Conclusions for waste treatment[5] which are relevant to the waste neutralisation process are reproduced in the table below and comprise the general BAT conclusions (BAT 1 to BAT 24) and BAT conclusions for the physico-chemical treatment of solid and/or pasty waste (BAT 40, 41) and BAT conclusions for the treatment of water based liquid waste (BAT 52, 53).

(ii) The relevance of the criteria specified in the BAT conclusions is related to the nature, scale and complexity of the waste neutralisation process. If any of the BAT criteria are considered not relevant this has been identified in the table. This BAT assessment should be read in conjunction with the technical description document for the waste neutralisation process which is provided at Appendix F to the permit variation application.

(iii) The EA Appropriate Measures guidance has also been reviewed as part of the assessment of BAT for the waste neutralisation process. As the EA Appropriate Measures guidance was published to implement the BAT Conclusions for waste treatment, the review is presented below with reference to the lead document, namely the BAT Conclusions document.

BAT Conclusion	Details to confirm that the process comprises BAT
1. General BAT Conclusions	
1.1 Overall environmental performance	
BAT 1 Environmental Management System	Augean South Limited (Augean) has implemented an Environmental Management System (EMS) at the site in accordance with the current Environmental Permit (the permit). The EMS is externally certified to ISO 14001 and the management system which includes the procedures relevant to the waste neutralisation process are subject to regular internal and external audits and reviews. The procedures take into account all the items listed in BAT 1.
BAT 2 Waste Acceptance	The existing waste pre-acceptance and acceptance procedures are included in the EMS implemented at the site and will be applied to all wastes accepted for processing in the waste neutralisation process. The procedures include aspects such as waste pre-acceptance, waste acceptance, waste verification and rejection, waste compatibility, waste characterisation and classification, waste segregation and waste tracking. Waste acceptance is undertaken by a suitably qualified Site Chemist. The example process flow diagram presented at Appendix A of the technical description document provides further details of the steps followed in respect of waste acceptance.

[5] COMMISSION IMPLEMENTING DECISION (EU) 2018/1147 of 10 August 2018 establishing best available techniques (BAT) conclusions for waste treatment, under Directive 2010/75/EU of the European Parliament and of the Council

BAT Conclusion	Details to confirm that the process comprises BAT
	All waste which is being considered for acceptance at the site must undergo suitable analysis and assessment to determine acceptability under the permit, safety for acceptance, suitability for processing, the nature of the processing necessary and whether the waste will be recovered or disposed. All waste is subject to compliance checking on arrival. Further physical and chemical checking may be undertaken on site to confirm the material is suitable for the intended use, to design targeted treatment batches to meet the specifications necessary for acceptance at the recovery facility or disposal facility and optimise process efficiency.
BAT 3 Emissions to water and air BAT Conclusion 3 is relevant to maintaining an inventory of waste water and waste gas streams to facilitate the reduction of emissions to water and to air and the technique comprises a component of the EMS (BAT 1)	Under the applicability heading for BAT3 it is stated: "*The scope (e.g. level of detail) and nature of the inventory will generally be related to the nature, scale and complexity of the installation, and the range of environmental impacts it may have".* As there are no direct discharges to waste water associated with the waste neutralisation process it is unnecessary to maintain an inventory of waste water. As there are no point source emissions to air associated with the waste neutralisation process it is unnecessary to maintain an inventory of waste gas streams.
BAT 4 Storage of waste The relevant aspects of BAT 4 relate to the provision of an optimised storage location, adequate storage capacity and safe storage operations.	The BAT conclusion for optimised storage location states: "*the storage is located as far as technically and economically possible from sensitive receptors…*" As shown on Figure 2, (drawing reference AU/KCW/12-20/22147) included with this application, the closest residential receptors are located approximately 500m from the treatment permit boundary. The treatment facility currently treats wastes similar to those which will be managed in the proposed waste neutralisation process and has been operating safely at this location for many years. The waste neutralisation process which is proposed to be undertaken at ENRMF treatment facility is already authorised and undertaken by Augean at their waste treatment facility at Port Clarence Waste Recovery Park (PC WRP[6]). The proposed waste neutralisation process at

[6] Augean Treatment Limited Environmental Permit Number EPR/YP3234XR/V007 for PC WRP, Stockton on Tees. Activity reference AR4 and AR38.

BAT Conclusion	Details to confirm that the process comprises BAT
	ENRMF will be consistent with the process currently undertaken by Augean at PC WRP. The planning and construction of the treatment facility at PC WRP was the subject of a HAZOP (Hazard and Operability) study to identify potential hazards and inform the design and layout of the plant. A similar HAZOP study will be undertaken in respect of the proposals for construction of the required treatment infrastructure at ENRMF relevant to the waste neutralisation process. Storage of solid wastes, including Air Pollution Control Residues (APCR) which is already authorised to be handled at the ENRMF site for use in the stabilisation process, will be consistent with the storage arrangements currently employed at the site including (depending on the nature of the material) storage in silos, bays or bunkers. Consistent with the tank farm at PC WRP, acids and alkalis will be stored in storage tanks, drums or IBCs constructed from materials which are compatible with and resistant to the stored liquids. The storage tanks will be bunded to provide secondary containment with sufficient capacity to contain 110% of the content of the tanks and the wider site surfacing comprises a concrete surface with sealed drainage to provide tertiary containment to tanks and secondary containment to drums and IBCs. Storage and treatment vessels are provided with instrumentation connected to alarms and trip switches to provide overfill protection. The storage areas and containers for incoming wastes have been suitably sized based on the proposed throughput of the activity. The quantity of waste held in the storage areas is monitored during regular site walkover surveys. Consistent with waste storage practices employed at the wider site over many years, wastes will be segregated as necessary. Consistent with the description presented in BAT 4 it is considered that this comprises an optimised storage location away from sensitive receptors and with no direct pathway to watercourses.
BAT 5 Handling and transfer of waste	All relevant staff employed at the site are suitably trained to handle waste including in respect of measures to prevent, detect and mitigate spills and will be trained to operate the plant associated with the waste neutralisation process. Relevant operational procedures are in place for the handling and transfer of waste. Training records are retained as part of the site EMS.

BAT Conclusion	Details to confirm that the process comprises BAT
	Current site procedures include appropriate measures for the control and competent supervision of the transfer of wastes from drums and tankers as well as the use and application of appropriate equipment and safety measures.
1. 2 Monitoring	
BAT 6 and BAT 7 Monitoring of emissions to water	As there are no direct discharges to waste water associated with the waste neutralisation process it is unnecessary to monitor process parameters relevant to emissions to water such as waste water flow, pH, temperature and conductivity (BAT 6) or to monitor emissions to water (BAT 7).
BAT 8 Monitoring of channelled emissions to air	**Channelled emissions** are defined in Section 6 of the waste treatment BREF[7] as "*Emissions of pollutants into the environment through any kind of duct, pipe, stack, etc. This also includes emissions from open-top biofilters*." **Diffuse emissions** are defined in Section 6 of the waste treatment BREF as "*Non-channelled emissions (e.g. of dust, organic compounds, odour) which can result from 'area' sources (e.g. **tanks**) or 'point' sources (e.g. pipe flanges). This also includes emissions from open-air windrow composting*". Based on the definitions presented above, there are no channelled emissions to air. It is therefore unnecessary to monitor emissions to air.
BAT 9 Monitoring of diffuse emissions of organic compounds to air	BAT 9 states: "*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*". As none of these activities are undertaken in the waste neutralisation process it is unnecessary to give further consideration to BAT 9.
BAT 10 Odour monitoring	Under the applicability heading for BAT10 it is stated: "*The applicability is restricted to cases where an odour nuisance at sensitive receptors is expected and/or has been substantiated".* The acceptance procedures at the site will prevent putrescible or malodourous wastes from being accepted for the waste neutralisation process. Wastes will undergo a technical assessment, which includes an assessment of odour potential, prior to being considered acceptable for the process. Notwithstanding that odour nuisance from the waste neutralisation process is not expected, regular sniff testing will be undertaken at the site in accordance with existing procedures and will include checks of the waste neutralisation process, as described in

[7] Best Available Techniques (BAT) Reference Document for Waste Treatment. Industrial Emissions Directive 2010/75/EU (Integrated Pollution Prevention and Control). EUR 29362EN. 2018

BAT Conclusion	Details to confirm that the process comprises BAT
	the odour management plan which is implemented at ENRMF including the treatment facility and the adjacent landfill site.
BAT 11 Annual consumption of water, energy and raw materials and annual generation of residues and waste water.	The annual consumption of water, energy and raw materials will continue to be recorded across all treatment activities including the new waste neutralisation process in a manner similar to the recording of these parameters currently at the site to satisfy the reporting requirements specified in the permit. Records of the annual generation of residues from the waste neutralisation process will be maintained and documented as part of the site EMS and included in the quarterly waste returns for the site which record the quantity of waste removed from the site following treatment.
1.3 Emissions to air	
BAT 12 Odour management plan	Under the applicability heading for BAT12 it is stated: "*The applicability is restricted to cases where an odour nuisance at sensitive receptors is expected and/or has been substantiated".* An Odour Management Plan (OMP) is implemented currently at ENRMF which includes the treatment facility and the landfill site. The OMP includes a protocol for odour monitoring by sniff testing and a protocol for investigating and responding to odour complaints. The waste acceptance process implemented at the site is designed to prevent odorous wastes from being accepted for treatment.
BAT 13 Odour reduction	BAT 13 refers to reduction of odour emissions relevant to open systems (e.g. compost windrows) or in relation to activities in which the waste in the process is being aerobically treated. It is unnecessary to give further consideration to BAT 13 for the waste neutralisation process.
BAT 14 Reduce diffuse emissions to air	The waste neutralisation process which is proposed to be undertaken at ENRMF treatment facility is already authorised and undertaken by Augean at the waste treatment facility at PC WRP[8]. The proposed waste neutralisation process at ENRMF will be consistent with the process currently undertaken by Augean at PC WRP. The planning and construction of the treatment facility at PC WRP was the subject of a HAZOP study to identify potential hazards and inform the design and layout of the plant. A similar HAZOP study will be undertaken in respect of the proposals for construction of the required treatment infrastructure at ENRMF relevant to the waste neutralisation process. The HAZOP includes aspects such as the materials of construction and specification of the tanks, vessels, pumps, valves and seals to minimise the potential for diffuse emissions to air.

[8] Augean Treatment Limited Environmental Permit Number EPR/YP3234XR/V007 for PC WRP, Stockton on Tees. Activity reference AR4 and AR38.

BAT Conclusion	Details to confirm that the process comprises BAT
	BAT 14 specifies that BAT14d is especially relevant to diffuse emissions to air. BAT 14d refers to containment of diffuse emissions. Storage of solid wastes, including APCR which is already authorised to be handled at the site for use in the stabilisation process, will be consistent with the storage arrangements currently employed at the site including (depending on the nature of the material) storage in silos, bays or bunkers. The bays and bunkers will provide a wind barrier to diffuse emissions. Waste materials with the potential to release particulate matter during transfer to the neutralisation vessel will be transferred via an enclosed screw conveyor to minimise the potential for diffuse emissions of particulate matter to air. Where waste materials are stored in bays and bunkers and where waste materials are handled by mobile plant, dust suppression using water sprays will be employed where necessary to minimise the potential for diffuse emissions of particulate matter to air. When handling waste materials with the potential to release particulate matter, drop heights will be minimised. Site speed limits are enforced at the site to minimise the potential for resuspension of particulate matter from site surfacing. The concrete site surfacing will be cleaned and dampened with water when necessary to minimise the potential for dust and particulate matter to build up on the site surfacing and comprise a source of particulate matter. Areas of the site in which waste is stored and treated will be regularly cleaned, including the plant used in the waste neutralisation process. Consistent with the tank farm at PC WRP, acids and alkalis will be stored in storage tanks, drums or IBCs. Abatement comprising a wet scrubber will be employed on liquid storage tank vents to abate fugitive emissions of volatile organic compounds, gaseous acidic compounds and gaseous alkaline compounds. This is consistent with the abatement employed for the liquid waste storage tanks associated with the waste neutralisation process already authorised and undertaken by Augean at PC WRP. The tanks, vessels, pumps, valves and pipework will be subject to regular inspections and routine planned preventative maintenance.
BAT 15 and BAT 16 Flaring	As there is no flare associated with or necessary for the waste neutralisation process it is unnecessary to give further consideration to BAT 15 and BAT 16.

BAT Conclusion	Details to confirm that the process comprises BAT
1.4 Noise and vibrations	
BAT 17 Noise and vibration management plan	Under the applicability heading for BAT17 it is stated: "*The applicability is restricted to cases where a noise or vibration nuisance at sensitive receptors is expected and/or has been substantiated".* The waste handling activities to be undertaken in the waste neutralisation process generally are similar to the activities undertaken for the currently permitted waste treatment processes for example loading and unloading of waste using mobile plant, transfer of solid, liquid and sludge wastes between tankers, storage vessels and tanks and mixing vessels. The facilities at ENRMF are an acknowledged part of the nationally significant infrastructure for the management of hazardous waste and are the subject of a Development Consent Order (DCO) which was granted in July 2013 and amended in June 2018. Augean is preparing to submit an application for a new DCO. An assessment of the noise impact of the proposed site wide operations, including the changes proposed at the waste treatment facility has been carried out in support of the application for a DCO. The results of the assessment demonstrate that there will be no significant or unacceptable adverse impacts at noise-sensitive premises in the vicinity as a result of the proposed operations. Current operations at the site do not cause unacceptable levels of noise hence currently the waste treatment facility does not operate to a formal Noise Management Plan. As noise or vibration nuisance at sensitive receptors is not expected it is unnecessary to give further consideration to BAT 17.
BAT 18 Noise and vibration reduction	The waste neutralisation process will employ where relevant, a combination of the techniques specified in BAT 18 to reduce noise and vibration emissions including; BAT18a – locating the equipment and operations distant (500m) from the closest residential receptors, BAT 18b - implementing operational procedures for inspection and maintenance of equipment, employing experienced, trained staff to operate the equipment, by restricting operations to day time hours and by operating of plant and machinery in a noise-sensitive manner.
1.5 Emissions to water	
BAT 19 Water consumption	Water is used at the waste treatment facility to condition wastes, for example APCR, to generate a suitable consistency to facilitate handling. In order to reduce water consumption at the waste treatment facility water regularly is substituted by landfill leachate from the adjacent landfill site. The use of landfill leachate as a substitute for water is authorised under the treatment plant permit.

BAT Conclusion	Details to confirm that the process comprises BAT
	Incoming wastes will be stored in tanks, IBCs, drums, silos, bays or bunkers. The wastes stored in tanks, IBCs, drums and silos will not come into contact with rainwater hence will not generate rainfall run-off. Where incoming waste or the output from the treatment process is stored in bays or bunkers the waste will be stored on a concrete surface with a sealed drainage system to capture rainfall run-off hence minimise the potential for waste at the site to contaminate soil and water. Rainfall run-off will be recycled in the waste treatment process where suitable. The site surfacing, storage tanks and silos, storage areas and drainage system will continue to be subject to periodic inspections to confirm the integrity of the containment.
BAT 20 Waste water treatment	As there are no direct discharges to waste water associated with the waste neutralisation process it is unnecessary to give further consideration to BAT 20.
1.6 Emissions from accidents and incidents	
BAT 21 The prevention and limitation of the environmental consequences of accidents and incidents.	An Accident Management Plan is currently implemented at the site under the site EMS in order to prevent and limit the environmental consequences of accidents and incidents. Security measures are employed at the site to prevent unauthorised entry to the site. Procedures are implemented at the site in respect of containment of spillages. The waste neutralisation process and associated storage area are provided with a concrete surface with a sealed drainage system. The Accident Management Plan includes procedures to record accidents, incidents and the findings of inspections and includes procedures to identify and respond to incidents and accidents.
1.7 Material efficiency	
BAT 22 Material efficiency	BAT is to substitute materials with waste. The description includes the statement *"Waste is used instead of other materials for the treatment of wastes (e.g. waste alkalis or waste acids are used for pH adjustment, fly ashes are used as binders"*. The permit currently authorises a number of recovery activities in which waste is used to substitute other materials, for example APCR waste is used as a lime based reagent to achieve waste stabilisation. The APCR provides an effective alternative to the use of other raw material reagents comprising lime or cement. In addition, leachate from the adjacent landfill or collected rainfall run-off is used as a substitute to the use of mains water for waste conditioning or hydration. The waste neutralisation process substitutes materials with waste including the use of waste alkalis or waste acids for pH adjustment.

BAT Conclusion	Details to confirm that the process comprises BAT
	Consistent with the description presented in BAT 22 it is considered that substitution of materials with waste in the waste neutralisation process comprises BAT.
1.8 Energy efficiency	
BAT 23 Energy efficiency	The plant and equipment specified for use in the waste neutralisation process will be designed and specified to operate in an energy efficient manner. The annual energy consumption will be recorded for the waste neutralisation process in a manner similar to the recording of energy consumption for the currently permitted treatment activities to satisfy the reporting requirements specified in the permit and in order to optimise energy efficiency at the site. As explained in the comments on BAT 22 the waste neutralisation process substitutes materials with waste including the use of alkaline or acidic wastes for pH adjustment. From a broader energy efficiency perspective, the use of waste to substitute raw materials provides a significant saving in energy usage by saving the emissions that would have been generated in extracting, processing and transporting the raw materials which have been substituted by the use of wastes.
1.9 Reuse of packaging	
BAT 24 Residues management plan	BAT is to maximise the reuse of packaging, as part of the residues management plan. Where feasible and safe to do so, packaging (drums, containers, IBCs) are reused for containing waste, when they are in good condition and sufficiently clean, depending on a compatibility check between the substances contained in the materials during consecutive uses. If necessary, packaging is sent for appropriate treatment prior to reuse (e.g. reconditioning, cleaning). If there is an unacceptable risk of contamination of the waste posed by the reuse of packaging then the packaging will not be reused or will be dispatched for rehabilitation off site. Options for reuse will be looked at company wide. Any non-reusable packaging will be managed using waste hierarchy principles.
2. GENERAL BAT CONCLUSIONS FOR THE MECHANICAL TREATMENT OF WASTE	
Not applicable to the waste neutralisation process (BAT 25 – BAT 32)	
3. BAT CONCLUSIONS FOR THE BIOLOGICAL TREATMENT OF WASTE	
Not applicable to the waste neutralisation process (BAT 33 – BAT 39)	

BAT Conclusion	Details to confirm that the process comprises BAT
4. BAT CONCLUSIONS FOR THE PHYSICO-CHEMICAL TREATMENT OF SOLID AND/OR PASTY WASTE	
4.1.1 Overall environmental performance	
BAT 40 Monitor waste input	The example process flow diagram presented at Appendix A of the technical description document provides further details of the steps followed in respect of waste acceptance including the monitoring of waste input. All waste to be potentially accepted at the site, including solid waste, sludges and pasty waste must undergo suitable analysis to determine acceptability under the permit, safety for acceptance, suitability for processing, the nature of the processing necessary and whether the intention is to recover or dispose of the waste. All waste is subject to compliance checking on arrival. Further physical and chemical checking may be undertaken on site to confirm the material is suitable for the intended treatment and subsequent use (if being subject to recovery), to design targeted treatment batches to meet the specifications necessary for acceptance at the recovery facility or disposal facility and optimise process efficiency. Further details in respect of waste acceptance are provided with the comments under BAT 2.
BAT 41	BAT is to apply BAT 14d and where there are channelled emissions to air to use one or a combination of the techniques adsorption, biofilter, fabric filter, wet scrubbing. Details demonstrating how the site activities follow BAT14d are presented above. As there are no channelled emissions to air it is unnecessary to give further consideration to BAT 41.

The remaining aspects in Section 4 comprising re-refining waste oil (4.2 and 4.5), treatment of waste with a calorific value (4.3 and 4.5), the regeneration of spent solvents (4.4 and 4.5), thermal treatment of activated carbon, waste catalysts and contaminated soil (4.6), soil washing (4.7) and decontamination of PCB containing equipment (4.8), BAT 42 – BAT 51 are not applicable to the waste neutralisation process.

BAT Conclusion	Details to confirm that the process comprises BAT
5. BAT CONCLUSIONS FOR THE TREATMENT OF WATER BASED LIQUID WASTE	
5.1 Overall environmental performance	
BAT 52 Monitor waste input	The example process flow diagram presented at Appendix A to the technical description document provides further details of the steps followed in respect of waste acceptance including the monitoring of waste input. All waste which is being considered for acceptance at the site, including liquid waste and acids and alkalis, must undergo suitable analysis to determine acceptability under the permit, safety for acceptance, suitability for processing, the nature of the processing necessary and whether the waste will be recovered or disposed. All waste is subject to compliance checking on arrival. Further physical and chemical checking may be undertaken on site to confirm the material is suitable for the intended use, to design targeted treatment batches to meet the specifications necessary for acceptance at the recovery facility or disposal facility and optimise process efficiency. Further details in respect of waste acceptance are provided under BAT 2.
5.2 Emissions to air	
BAT 53 Emissions to air	BAT is to apply BAT 14d and where there are channelled emissions to air to use one or a combination of the techniques adsorption, biofilter, thermal oxidation, wet scrubbing. Details demonstrating how the site activities follow BAT14d are presented above. As explained under BAT 8, as there are no channelled emissions to air it is unnecessary to give further consideration to BAT 53. Although there are no channelled emissions to air associated with the storage and treatment of waste liquids, abatement comprising a wet scrubber will be employed on liquid storage tank vents and the vent on the mixing vessel to abate fugitive emissions of volatile organic compounds, gaseous acidic compounds and gaseous alkaline compounds. The liquid scrubbing medium will be specified and selected based on the contents of the storage tank or mixing vessel (eg alkaline scrubber for gaseous acidic compounds, acid scrubber for gaseous alkaline compounds). This is consistent with the abatement employed for the liquid waste storage tanks and mixing vessel for the waste neutralisation process already authorised and undertaken by Augean at the waste treatment facility at PC WRP.