AN APPLICATION TO VARY ENVIRONMENTAL PERMIT NUMBER EPR/YP3138XB FOR THE WASTE TREATMENT FACILITY OPERATED BY AUGEAN SOUTH LIMITED AT EAST NORTHANTS RESOURCE MANAGEMENT FACILITY

TECHNICAL DESCRIPTION OF THE WASTE NEUTRALISATION PROCESS

Report reference: AU/KCW/AW/5651/01/TD
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Technical advisers on environmental issues

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1. Introduction

1.1 MJCA is commissioned by Augean South Limited (Augean) to prepare an application to vary Environmental Permit number EPR/YP3138XB (the permit) for the Waste Treatment Facility operated by Augean at East Northants Resource Management Facility (ENRMF), Stamford Road, Peterborough, PE8 6XX.

1.2 This document comprises a technical description of the proposed waste neutralisation process.

1.3 An enhanced pre-application advice meeting was held with the Environment Agency on 19 November 2020 to discuss the scope of the variation application and formal pre-application advice was provided by the Environment Agency in a letter dated 23 November 2020. Copies of the correspondence associated with the pre-application advice are presented at Appendix A of the application to vary the permit. This technical description document has been prepared with reference to the letter dated 23 November 2020 in which the Environment Agency advised that the following details would be required to support the application to vary the permit:

- Risk Assessment - report reference AU/KCW/AW/5651/01/ERA (Appendix H)
- BAT Assessment - report reference AU/KCW/AW/5651/01/BAT (Appendix G)
- Process flow information – Section 3, Figure A and Appendix A of this report
- Process equipment – Section 3 and Figure A of this report
- Acid tank secondary containment details - Section 3 of this report
- Reaction information - Section 3 of this report
- Waste types - Section 3 and Table A and Table B of this report
- Outputs - Section 4 of this report
- Potential destinations for recovery - Section 4 of this report
- Acids types and mixing ratios - Section 3 of this report
- pH and temperature control - Section 3 of this report
- Controls for the recovery of waste and disposal of waste – inputs and outputs - Sections 3 and 4 and Appendix A of this report.

2. The proposed activities

2.1 Augean undertakes a range of waste treatment processes as authorised by the permit at ENRMF focussing on the treatment of difficult to manage wastes largely comprising hazardous wastes. One of the major treatment processes currently authorised at the site is the stabilisation and solidification of contaminated bulk wastes such as soils, dredgings and filtercakes via the treatment plant. This process has been operating under the permit for over 10 years. The objective of the processes is to minimise the rate of contaminant migration to the environment, to reduce the level of toxicity of contaminants and/or to solidify the waste, in order to alter or improve the characteristics of the waste so that it can be recovered for use at a suitably authorised facility or disposed. The treatment objective for a particular waste can encompass a reduction in the waste toxicity and/or mobility, a beneficial change in its physical nature and/or an improvement in the engineering properties of the treated material. The activities comprising stabilisation of hazardous waste for disposal (activity reference AR2), stabilisation of non-hazardous waste for disposal (AR4), solidification/stabilisation of hazardous waste for recovery (AR3) and solidification/stabilisation of non-hazardous waste for recovery (AR17) already are permitted to be undertaken at the site as specified in Table S1.1 of the permit.

2.2 It is proposed that a waste treatment process already authorised and undertaken by Augean at the waste treatment facility at Port Clarence Waste Recovery Park (PC WRP[1]) is introduced at the ENRMF site. The waste treatment process comprises the neutralisation of hazardous waste and non-hazardous waste. The proposed waste neutralisation process at ENRMF will be consistent with the process currently undertaken by Augean at PC WRP. The waste neutralisation process therefore comprises a process approved previously by the Environment Agency and a process for which Augean has operational experience.

2.3 Further details of the waste neutralisation process, including the input waste types, process equipment, process controls and output management are presented in subsequent sections of this technical description document.

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

2.4 The wastes treated in the waste neutralisation process will comprise the treatment of both hazardous and non-hazardous wastes and the process output will be recovered at a suitability authorised facility or disposed. For the purpose of this report the destination for the output from the waste treatment process will be referred to as the receiving facility. Irrespective of whether the receiving facility will recover or dispose the output from the waste treatment process, the receiving facility will have a specification for the material which can be accepted. For example, for disposal at a hazardous waste landfill site the specification will comprise the hazardous waste acceptance criteria (WAC)[2] and for a recovery activity the receiving facility will have a specification which may for example require the waste to be non-hazardous and may require certain metal concentrations to be below certain thresholds. Examples of potential receiving facilities are presented later in this report as examples for reference purposes only.

2.5 Consistent with the permit for PC WRP and consistent generally with the pre-application advice the activity references, descriptions of the activities and relevant D and R codes for the waste neutralisation process will be as shown in the table below:

Activity listed in Schedule 1 of EPR[3]	**Description of activity**	**D / R code**
S5.3 A(1)(a)(vi)	Neutralisation of **hazardous** waste for **recovery**	R5
S5.3 A(1)(a)(ii)	Neutralisation of **hazardous** waste for **disposal**	D9
Waste Operation	Neutralisation of **non-hazardous** waste for **recovery**	R5
S5.4 A(1)(a)(ii)	Neutralisation of **non-hazardous** waste for **disposal**	D9

[2] Or other site specific WAC specified in the permit for the landfill site

[3] The Environmental Permitting (England and Wales) Regulations 2016 UK SI No. 1154

3. Waste Neutralisation Process

3.1 It is proposed that Air Pollution Control Residues (APCR) and other such wastes are subject to neutralisation generating a hazardous or non-hazardous waste output for recovery or disposal at a suitably permitted facility.

3.2 The wastes that can be processed are listed in Table A (hazardous wastes) and Table B (non-hazardous wastes) of this report[4]. The waste types specified in Table A and in Table B are identical to the waste types specified in Table S2.14 and Table S2.15 respectively of the waste treatment facility operated by Augean at PC WRP[5]. Non-hazardous wastes are included as they may still exhibit properties that would benefit from treatment by neutralisation to facilitate secondary processing at the receiving facility.

3.3 The waste listed in Table A and B fall into one of the three following categories:

- Bulk waste (solid highly alkaline/acidic material) (such as APCR)
- Liquid (acid or alkali) necessary to adjust residual alkalinity/acidity to levels suitable for acceptance at the receiving facility
- Granular material

3.4 A wide range of liquid waste codes have been included in Table A and Table B. These codes have been selected carefully based on Augean's experience of handling such wastes including at PC WRP. Although the description of the waste type (e.g. mother liquors 07 02 04*) does not specify whether the waste is an acid or an alkali, these waste types can have significant acidity or alkalinity of value to the neutralisation process. The waste acceptance process will be used to determine whether any individual waste stream is suitable for the specific treatment process being considered.

[4] Although it is considered unnecessary to specify the hazardous wastes and non-hazardous wastes in separate tables it is understood that this is the approach taken by the Environment Agency for the PC WRP permit.

[5] Environmental Permit Number EPR/YP3234XR/V007.

3.5 The outputs from the treatment process typically require the addition and inclusion of granular materials in order to meet the physical specification of the materials for use at the receiving recovery facility.

3.6 All outputs will need to meet the acceptance criteria of the receiving facility. All of the waste types specified in Table A and Table B are potentially suitable for recovery but the nature and specific types of waste inputs used for any specific recovery output will be selected so that the output from the treatment process will meet the specification of the receiving recovery facility. In the event that the output does not meet the specification for recovery at the receiving facility it will be necessary for the output to meet the waste acceptance criteria for the disposal facility, for example the hazardous waste WAC for disposal at a hazardous waste landfill site or the waste must be classified as non-hazardous waste for disposal at a non-hazardous waste landfill site.

3.7 No component will be added for the sole purpose of diluting contaminants. In accordance with best practice for all treatment activities three fundamental steps are taken to achieve appropriate control of the treatment process and outputs

(i) adequately characterising the input waste

(ii) ensuring that the input waste and treatment activity are suitable for the intended recovery or disposal activity

(iii) ensuring operational control of the treatment process including inputs, reaction monitoring and having clear end-point objectives irrespective of whether the output is destined for recovery or disposal

3.8 A process flow diagram illustrating the controls already in place at the site in respect of the currently permitted activities is presented at Appendix A to this report. The process flow controls will be applied also to the waste neutralisation process to ensure that the necessary steps throughout the whole process from the initial waste treatment enquiry through to the despatch of a suitably treated and coded residue from the facility. Further details of the controls in place, which should be read in conjunction with the flow diagram at Appendix A, are presented below.

- Pre-acceptance: All waste to be potentially accepted at the site must undergo suitable analysis to determine acceptability under the permit, safety for acceptance, suitability for neutralisation, identification of the nature of the processing necessary and whether the waste will be recovered or disposed.
- On agreement that the waste will be accepted for treatment at the facility, the Duty of Care applies for the transfer of the waste to the site.
- The waste is subject to compliance checking on arrival.
- Further physical and chemical checking may be undertaken on site to confirm the material is as expected and is suitable for the intended treatment process, to design targeted treatment batches to meet the specification necessary for acceptance at the recovery facility or disposal facility and to optimise process efficiency.
- The on-site processes are the subject of regulatory requirements and permit conditions which in particular include:
  - EWC codes specific to the process
  - Confirmation that the objective of the treatment process is specified and achieved
  - Process limitations for the plant
- The efficiency of the process in terms of optimum use of waste resources or raw materials such as cement if necessary is driven by the specification for the output required by the recovery facility or disposal facility.
- Testing to demonstrate that the process output meets the specification for the designated permitted recovery facility or disposal facility
- Approval by the recovery or disposal facility that the material can be accepted
- Duty of care for the transfer of the output material to the recovery facility or disposal facility
- Acceptance processes of the recovery facility or disposal facility.

3.9 Consistent with the tank storage area at PC WRP, liquid 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 the tanks and secondary containment for drums and IBCs**.** The design 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 the construction of the storage tank and treatment infrastructure at ENRMF relevant to the waste neutralisation process. Storage of solid wastes, including APCR which is already authorised to be

handled at the site for use in the stabilisation and solidification 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.

3.10 Liquid acids (or alkalis depending on the nature of the waste being treated and the output objective) stored in tanks, drums or IBCs will be mixed with APCR and/or similar wastes in an enclosed mixing vessel at carefully controlled ratios to adjust the pH. Liquids will be added using dosing pumps and solid wastes will be added by a screw conveyor fed using mobile plant or from a silo or bag handling unit. Consistent with the process undertaken at PC WRP the process will be controlled using a programmable logic controller (PLC) which will enable the key process variables including pH and temperature to be monitored during the relevant stages of the waste input and treatment process. A simplified schematic of the process flow is presented on Figure A. The objective will be to produce a neutralised or part neutralised output in order to meet the specification of the receiving facility. If the specification for the receiving permitted facility requires other parameters to be controlled, for example maximum concentrations of specified metals, further control measures would be applied such as controls on the input and therefore output concentrations of metals as necessary.

3.11 An activity specific limit of 250,000 tonnes per annum is proposed for the waste neutralisation process.

4. Outputs and potential destination for recovery

4.1 As described earlier in this report, the output from the waste neutralisation process will be recovered at a suitability authorised facility or disposed. Where an output is to be recovered it will need to meet the acceptance criteria of the receiving facility. Each treatment process intended to produce an output which will be used at a specific recovery facility will be the subject of a Process Statement. An example Process Statement relevant to the activity for the solidification/stabilisation of waste is presented at Appendix B. The solidification/stabilisation of waste for the purpose of recovery already is authorised under the ENRMF treatment permit.

4.2 Further examples of recovery processes where outputs from the ENRMF treatment facility including outputs from the waste neutralisation process could be sent for recovery are presented at Appendix C.

4.3 The inputs to the process will be controlled to achieve outputs which meet the physical and chemical specification as defined by the relevant recovery facility. The prepared material could be used, as in the example of the Wellbeck Colliery Waste Facility, to produce materials for use in restoration projects.

4.4 It will be necessary to control input wastes to ensure that specifications for the acceptability of the output materials are not exceeded. For the Wellbeck example chloride, sulphate and TPH are critical to the acceptability of the output for use in recovery.

4.5 The examples provided in this report demonstrate that feasible recovery outlets are available for the output from the treatment processes at ENRMF treatment facility including the waste neutralisation process. The Process Statement and examples presented in this report should not comprise specified operating techniques of the ENRMF permit as the specification and parameters will vary and will relate to the particular recovered end use of the material at each permitted site at which the material is used.

TABLES

Table A

Permitted waste types (hazardous wastes) for the waste neutralisation process

The List of Wastes (LoW) specified in Table A is identical to the LoW specified in Table S2.14 of Environmental Permit Number EPR/YP3234XR/V007 for Port Clarence Waste Recovery Park [1]

LoW Code	Waste Description
01	WASTES RESULTING FROM EXPLORATION, MINING, QUARRYING, AND PHYSICAL AND CHEMICAL TREATMENT OF MINERALS
01 05	drilling muds and other drilling wastes
01 05 06*	drilling muds and other drilling wastes containing hazardous substances
01 05 07*	barite-containing drilling muds and wastes other than those mentioned in 01 05 05 and 01 05 06
06	WASTES FROM INORGANIC CHEMICAL PROCESSES
06 01	wastes from the manufacture, formulation, supply and use (MFSU) of acids
06 01 01*	sulphuric acid and sulphurous acid
06 01 02*	hydrochloric acid
06 01 04*	phosphoric and phosphorous acid
06 01 06*	other acids
06 05	sludges from on-site effluent treatment
06 05 02*	sludges from on-site effluent treatment containing hazardous substances
06 07	wastes from the MFSU of halogens and halogen chemical processes
06 07 04*	solutions and acids, for example contact acid
07	WASTES FROM ORGANIC CHEMICAL PROCESSES
07 01	wastes from the manufacture, formulation, supply and use (MFSU) of basic organic chemicals
07 01 01*	aqueous washing liquids and mother liquors
07 01 04*	other organic solvents, washing liquids and mother liquors
07 01 08*	other still bottoms and reaction residues
07 01 11*	sludges from on-site effluent treatment containing hazardous substances
07 02	wastes from the MFSU of plastics, synthetic rubber and man-made fibres
07 02 01*	aqueous washing liquids and mother liquors
07 02 04*	other organic solvents, washing liquids and mother liquors
07 02 08*	other still bottoms and reaction residues
07 02 11*	sludges from on-site effluent treatment containing hazardous substances
07 02 14*	wastes from additives containing hazardous substances
07 05	wastes from the MFSU of pharmaceuticals
07 05 01*	aqueous washing liquids and mother liquors
07 05 04*	other organic solvents, washing liquids and mother liquors
07 05 08*	other still bottoms and reaction residues
07 06	wastes from the MFSU of fats, grease, soaps, detergents, disinfectants and cosmetics
07 06 01*	aqueous washing liquids and mother liquors
07 06 04*	other organic solvents, washing liquids and mother liquors
07 06 08*	other still bottoms and reaction residues
07 06 11*	sludges from on-site effluent treatment containing hazardous substances
07 07	wastes from the MFSU of fine chemicals and chemical products not otherwise specified
07 07 01*	aqueous washing liquids and mother liquors
07 07 04*	other organic solvents, washing liquids and mother liquors
07 07 08*	other still bottoms and reaction residues

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

LoW Code	Waste Description
07 07 11*	sludges from on-site effluent treatment containing hazardous substances
10	WASTES FROM THERMAL PROCESSES
10 01	wastes from power stations and other combustion plants (except 19)
10 01 09*	sulphuric acid
10 01 14*	bottom ash, slag and boiler dust from co-incineration containing hazardous substances
10 01 16*	fly ash from co-incineration containing hazardous substances
10 01 18*	wastes from gas cleaning containing hazardous substances
10 01 20*	sludges from on-site effluent treatment containing hazardous substances
10 01 22*	aqueous sludges from boiler cleansing containing hazardous substances
10 03	wastes from aluminium thermal metallurgy
10 03 21*	other particulates and dust (including ball-mill dust) containing hazardous substances
10 09	wastes from casting of ferrous pieces
10 09 11*	other particulates containing hazardous substances
10 09 13*	waste binder containing hazardous substances
10 10	wastes from casting of non-ferrous pieces
10 10 11*	other particulates containing hazardous substances
10 10 13*	waste binder containing hazardous substances
10 11	wastes from manufacture of glass and glass products
10 11 11*	waste glass in small particles and glass powder containing hazardous substances
10 11 13*	glass polishing and grinding sludge containing hazardous substances
10 13	wastes from manufacture of cement, lime and plaster and articles and products made from them
10 13 12*	solid wastes from gas treatment containing hazardous substances
11	WASTES FROM CHEMICAL SURFACE TREATMENT AND COATING OF METALS AND OTHER MATERIALS; NON-FERROUS HYDRO-METALLURGY
11 01	wastes from chemical surface treatment and coating of metals and other materials (for example galvanic processes, zinc coating processes, pickling processes, etching, phosphatising, alkaline degreasing, anodising)
11 01 05*	pickling acids
11 01 06*	acids not otherwise specified
11 01 07*	pickling bases
11 01 08*	phosphatising sludges
11 01 11*	aqueous rinsing liquids containing hazardous substances
11 01 98*	other wastes containing hazardous substances
16	WASTES NOT OTHERWISE SPECIFIED IN THE LIST
16 06	batteries and accumulators
16 06 06*	separately collected electrolyte from batteries and accumulators (except electrolyte from lead-acid batteries)
16 07	wastes from transport tank, storage tank and barrel cleaning (except 05 and 13)
16 07 09*	wastes containing other hazardous substances
16 08	spent catalysts
16 08 06*	spent liquids used as catalysts
16 10	aqueous liquid wastes destined for off-site treatment
16 10 01*	aqueous liquid wastes containing hazardous substances
16 10 03*	aqueous concentrates containing hazardous substances
17	CONSTRUCTION AND DEMOLITION WASTES (INCLUDING EXCAVATED SOIL FROM CONTAMINATED SITES)
17 01	concrete, bricks, tiles and ceramics
17 01 06*	mixtures of, or separate fractions of concrete, bricks, tiles and ceramics containing hazardous substances
17 05	soil (including excavated soil from contaminated sites), stones and dredging spoil
17 05 03*	soil and stones containing hazardous substances
17 05 05*	dredging spoil containing hazardous substances

Table A

LoW Code	Waste Description
17 05 07*	track ballast containing hazardous substances
17 05 11*	sludges from on-site effluent treatment containing hazardous substances
18	WASTES FROM HUMAN OR ANIMAL HEALTH CARE AND/OR RELATED RESEARCH (except kitchen and restaurant wastes not arising from immediate health care)
18 02	wastes from research, diagnosis, treatment or prevention of disease involving animals
18 02 05*	chemicals consisting of or containing hazardous substances
19	WASTES FROM WASTE MANAGEMENT FACILITIES, OFF-SITE WASTE WATER TREATMENT PLANTS AND THE PREPARATION OF WATER INTENDED FOR HUMAN CONSUMPTION AND WATER FOR INDUSTRIAL USE
19 01	wastes from incineration or pyrolysis of waste
19 01 06*	aqueous liquid wastes from gas treatment and other aqueous liquid wastes
19 01 07*	solid wastes from gas treatment
19 01 11*	bottom ash and slag containing hazardous substances
19 01 13*	fly ash containing hazardous substances
19 01 15*	boiler dust containing hazardous substances
19 02	wastes from physico/chemical treatments of waste (including dechromatation, decyanidation, neutralisation)
19 02 04*	premixed wastes composed of at least one hazardous waste
19 02 05*	sludges from physico/chemical treatment containing hazardous substances
19 02 11*	other wastes containing hazardous substances
19 03	stabilised/solidified wastes
19 03 04*	wastes marked as hazardous, partly stabilised
19 03 06*	wastes marked as hazardous, solidified
19 07	landfill leachate
19 07 02	landfill leachate containing hazardous substances
19 08	wastes from waste water treatment plants not otherwise specified
19 08 13*	sludges containing hazardous substances from other treatment of industrial waste water
19 11	wastes from oil regeneration
19 11 03*	aqueous liquid wastes
19 11 05*	sludges from on-site effluent treatment containing hazardous substances
19 12	wastes from the mechanical treatment of waste (for example sorting, crushing, compacting, pelletising) not otherwise specified
19 12 11*	other wastes (including mixtures of materials) from mechanical treatment of waste containing hazardous substances
19 13	wastes from soil and groundwater remediation
19 13 01*	solid wastes from soil remediation containing hazardous substances
19 13 03*	sludges from soil remediation containing hazardous substances
19 13 05*	sludges from groundwater remediation containing hazardous substances
19 13 07*	aqueous liquid wastes and aqueous concentrates from groundwater remediation containing hazardous substances
20	MUNICIPAL WASTES (HOUSEHOLD WASTE AND SIMILAR COMMERCIAL, INDUSTRIAL AND INSTITUTIONAL WASTES) INCLUDING SEPARATELY COLLECTED FRACTIONS
20 01	separately collected fractions (except 15 01)
20 01 14*	acids
20 01 15*	alkalines

Table B

Permitted waste types (non-hazardous wastes) for the waste neutralisation process

The List of Wastes (LoW) specified in Table B is identical to the LoW specified in Table S2.15 of Environmental Permit Number EPR/YP3234XR/V007 for Port Clarence Waste Recovery Park [1]

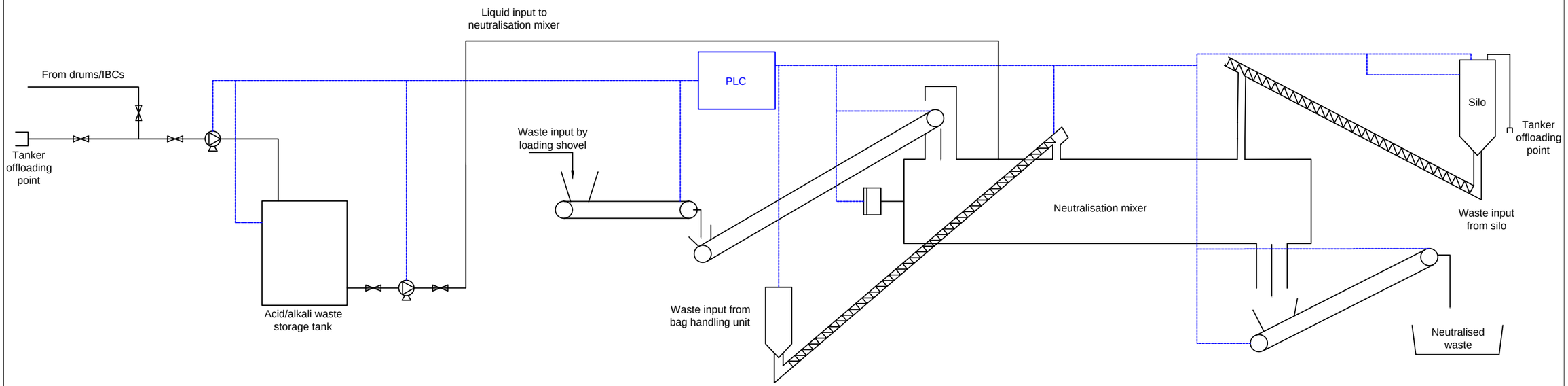
LoW Code	Waste Description
01	WASTES RESULTING FROM EXPLORATION, MINING, QUARRYING, AND PHYSICAL AND CHEMICAL TREATMENT OF MINERALS
01 05	drilling muds and other drilling wastes
01 05 04	freshwater drilling muds and wastes
01 05 08	chloride-containing drilling muds and wastes other than those mentioned in 01 05 05 and 01 05 06
02	WASTES FROM AGRICULTURE, HORTICULTURE, AQUACULTURE, FORESTRY, HUNTING AND FISHING, FOOD PREPARATION AND PROCESSING
02 01	wastes from agriculture, horticulture, aquaculture, forestry, hunting and fishing
02 01 01	sludges from washing and cleaning
02 02	wastes from the preparation and processing of meat, fish and other foods of animal origin
02 02 01	sludges from washing and cleaning
02 02 04	sludges from on-site effluent treatment
02 03	wastes from fruit, vegetables, cereals, edible oils, cocoa, coffee, tea and tobacco preparation and processing; conserve production; yeast and yeast extract production, molasses preparation and fermentation
02 03 01	sludges from washing, cleaning, peeling, centrifuging and separation
02 03 05	sludges from on-site effluent treatment
02 04	wastes from sugar processing
02 04 03	sludges from on-site effluent treatment
02 06	wastes from the baking and confectionery industry
02 06 03	sludges from on-site effluent treatment
06	WASTES FROM INORGANIC CHEMICAL PROCESSES
06 05	sludges from on-site effluent treatment
06 05 03	sludges from on-site effluent treatment other than those mentioned in 06 05 02
07	WASTES FROM ORGANIC CHEMICAL PROCESSES
07 01	wastes from the manufacture, formulation, supply and use (MFSU) of basic organic chemicals
07 01 12	sludges from on-site effluent treatment other than those mentioned in 07 01 11
07 02	wastes from the MFSU of plastics, synthetic rubber and man-made fibres
07 02 12	sludges from on-site effluent treatment other than those mentioned in 07 02 11
07 02 15	wastes from additives other than those mentioned in 07 02 14
07 05	wastes from the MFSU of pharmaceuticals
07 05 12	sludges from on-site effluent treatment other than those mentioned in 07 05 11
07 06	wastes from the MFSU of fats, grease, soaps, detergents, disinfectants and cosmetics
07 06 12	sludges from on-site effluent treatment other than those mentioned in 07 06 11
07 07	wastes from the MFSU of fine chemicals and chemical products not otherwise specified
07 07 12	sludges from on-site effluent treatment other than those mentioned in 07 07 11
10	WASTES FROM THERMAL PROCESSES
10 01	wastes from power stations and other combustion plants (except 19)
10 01 01	bottom ash, slag and boiler dust (excluding boiler dust mentioned in 10 01 04)
10 01 05	calcium-based reaction wastes from flue-gas desulphurisation in solid form
10 01 07	calcium-based reaction wastes from flue-gas desulphurisation in sludge form

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

LoW Code	Waste Description
10 01 15	bottom ash, slag and boiler dust from co-incineration other than those mentioned in 10 01 14
10 01 17	fly ash from co-incineration other than those mentioned in 10 01 16
10 01 19	wastes from gas cleaning other than those mentioned in 10 01 05, 10 01 07 and 10 01 18
10 01 21	sludges from on-site effluent treatment other than those mentioned in 10 01 20
10 01 23	aqueous sludges from boiler cleansing other than those mentioned in 10 01 22
10 01 26	wastes from cooling-water treatment
10 02	wastes from the iron and steel industry
10 02 12	wastes from cooling-water treatment other than those mentioned in 10 02 11
10 03	wastes from aluminium thermal metallurgy
10 03 22	other particulates and dust (including ball-mill dust) other than those mentioned in 10 03 21
10 03 28	wastes from cooling-water treatment other than those mentioned in 10 03 27
10 04	wastes from lead thermal metallurgy
10 04 10	wastes from cooling-water treatment other than those mentioned in 10 04 09
10 05	wastes from zinc thermal metallurgy
10 05 09	wastes from cooling-water treatment other than those mentioned in 10 05 08
10 06	wastes from copper thermal metallurgy
10 06 10	wastes from cooling-water treatment other than those mentioned in 10 06 09
10 07	wastes from silver, gold and platinum thermal metallurgy
10 07 08	wastes from cooling-water treatment other than those mentioned in 10 07 07
10 08	wastes from other non-ferrous thermal metallurgy
10 08 20	wastes from cooling-water treatment other than those mentioned in 10 08 19
10 09	wastes from casting of ferrous pieces
10 09 14	waste binders other than those mentioned in 10 09 13
10 10	wastes from casting of non-ferrous pieces
10 10 14	waste binders other than those mentioned in 10 10 13
10 11	wastes from manufacture of glass and glass products
10 11 12	waste glass other than those mentioned in 10 11 11
10 11 14	glass polishing and grinding sludge other than those mentioned in 10 11 13
10 12	wastes from manufacture of ceramic goods, bricks, tiles and construction products
10 12 03	particulates and dust
10 13	wastes from manufacture of cement, lime and plaster and articles and products made from them
10 13 04	wastes from calcination and hydration of lime
10 13 06	particulates and dust (except 10 13 12 and 10 13 13)
10 13 11	wastes from cement-based composite materials other than those mentioned in 10 13 09 and 10 13 10
10 13 13	solid wastes from gas treatment other than those mentioned in 10 13 12
10 13 14	waste concrete and concrete sludge
11	WASTES FROM CHEMICAL SURFACE TREATMENT AND COATING OF METALS AND OTHER MATERIALS; NON-FERROUS HYDRO-METALLURGY
11 01	wastes from chemical surface treatment and coating of metals and other materials (for example galvanic processes, zinc coating processes, pickling processes, etching, phosphatising, alkaline degreasing, anodising)
11 01 12	aqueous rinsing liquids other than those mentioned in 11 01 11
16	WASTES NOT OTHERWISE SPECIFIED IN THE LIST
16 10	aqueous liquid wastes destined for off-site treatment
16 10 02	aqueous liquid wastes other than those mentioned in 16 10 01
16 10 04	aqueous concentrates other than those mentioned in 16 10 03
17	CONSTRUCTION AND DEMOLITION WASTES (INCLUDING EXCAVATED SOIL FROM CONTAMINATED SITES)
17 01	concrete, bricks, tiles and ceramics
17 01 01	concrete
17 05	soil (including excavated soil from contaminated sites), stones and dredging spoil
17 05 04	soil and stones other than those mentioned in 17 05 03

LoW Code	Waste Description
17 05 06	dredging spoil other than those mentioned in 17 05 05
17 05 08	track ballast other than those mentioned in 17 05 07
18	WASTES FROM HUMAN OR ANIMAL HEALTH CARE AND/OR RELATED RESEARCH (except kitchen and restaurant wastes not arising from immediate health care)
18 02	wastes from research, diagnosis, treatment or prevention of disease involving animals
18 02 06	chemicals other than those mentioned in 18 02 05
19	WASTES FROM WASTE MANAGEMENT FACILITIES, OFF-SITE WASTE WATER TREATMENT PLANTS AND THE PREPARATION OF WATER INTENDED FOR HUMAN CONSUMPTION AND WATER FOR INDUSTRIAL USE
19 01	wastes from incineration or pyrolysis of waste
19 01 12	bottom ash and slag other than those mentioned in 19 01 1 1
19 02	wastes from physico/chemical treatments of waste (including dechromatation, decyanidation, neutralisation)
19 02 03	premixed wastes composed only of non-hazardous wastes
19 02 06	sludges from physico/chemical treatment other than those mentioned in 19 02 05
19 03	stabilised/solidified wastes
19 03 05	stabilised wastes other than those mentioned in 19 03 04
19 03 07	solidified wastes other than those mentioned in 19 03 06
19 04	vitrified waste and wastes from vitrification
19 04 02	fly ash and other flue gas treatment wastes
19 07	landfill leachate
19 07 03	landfill leachate other than those mentioned in 19 07 02
19 08	wastes from waste water treatment plants not otherwise specified
19 08 05	sludges from treatment of urban waste water
19 08 14	sludges from other treatment of industrial waste water other than those mentioned in 19 08 13
19 09	wastes from the preparation of water intended for human consumption or water for industrial use
19 11	wastes from oil regeneration
19 11 06	sludges from on-site effluent treatment other than those mentioned in 19 11 05
19 12	wastes from the mechanical treatment of waste (for example sorting, crushing, compacting, pelletising) not otherwise specified
19 12 12	other wastes (including mixtures of materials) from mechanical treatment of wastes other than those mentioned in 19 12 11
19 13	wastes from soil and groundwater remediation
19 13 02	soils wastes from soil remediation other than those mentioned in 19 13 01
19 13 04	sludges from soil remediation other than those mentioned in 19 13 03
19 13 06	sludges from groundwater remediation other than those mentioned in 19 13 05
19 13 07	aqueous liquid wastes and aqueous concentrates from groundwater remediation containing hazardous substances
19 13 08	aqueous liquid wastes and aqueous concentrates from groundwater remediation other than those mentioned in 19 13 07

FIGURES



Key / Notes

Belt conveyor

Screw conveyor

PLC control

Rev	Status	Drn	App	Chk	Date
	Final	KR	AW	LH	20/05/21

Site
EAST NORTHANTS RESOURCE MANAGEMENT FACILITY

Client
Augean SOUTH LTD

Title
Indicative flow diagram for the waste neutralisation process

Figure A

Scale
NTS@A3

Drawing Ref
AU/KCW/05-21/22417

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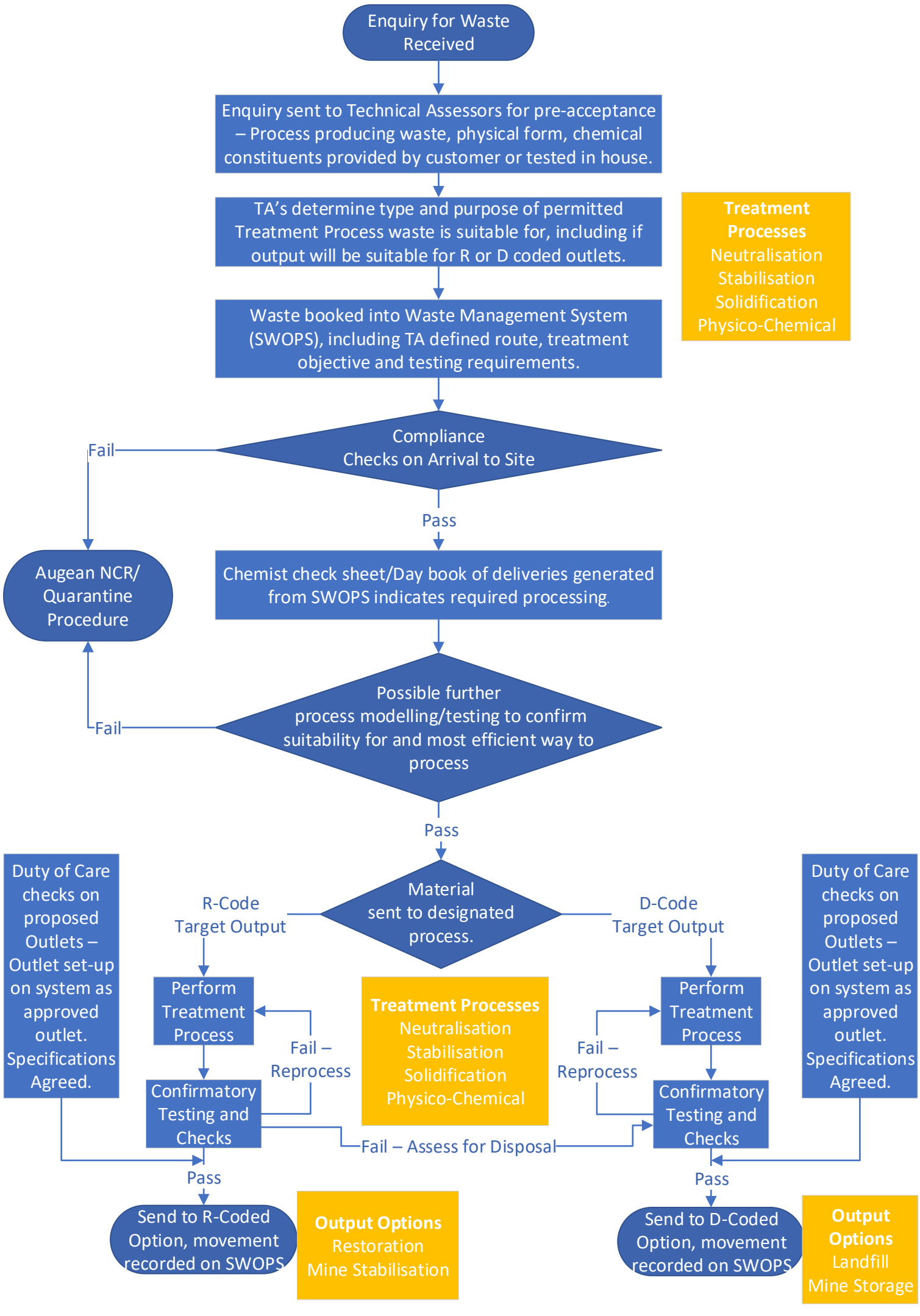
APPENDICES

APPENDIX A

PROCESS FLOW


Enquiry for Waste Received
Enquiry sent to Technical Assessors for pre-acceptance – Process producing waste, physical form, chemical constituents provided by customer or tested in house.
TA's determine type and purpose of permitted Treatment Process waste is suitable for, including if output will be suitable for R or D coded outlets.
Treatment Processes
Neutralisation
Stabilisation
Solidification
Physico-Chemical
Waste booked into Waste Management System (SWOPS), including TA defined route, treatment objective and testing requirements.
Compliance Checks on Arrival to Site
Fail
Pass
Augean NCR/ Quarantine Procedure
Chemist check sheet/Day book of deliveries generated from SWOPS indicates required processing.
Possible further process modelling/testing to confirm suitability for and most efficient way to process
Fail
Pass
Material sent to designated process.
R-Code Target Output
D-Code Target Output
Duty of Care checks on proposed Outlets – Outlet set-up on system as approved outlet. Specifications Agreed.
Perform Treatment Process
Fail – Reprocess
Confirmatory Testing and Checks
Treatment Processes
Neutralisation
Stabilisation
Solidification
Physico-Chemical
Perform Treatment Process
Fail – Reprocess
Confirmatory Testing and Checks
Duty of Care checks on proposed Outlets – Outlet set-up on system as approved outlet. Specifications Agreed.
Fail – Assess for Disposal
Pass
Pass
Send to R-Coded Option, movement recorded on SWOPS
Output Options
Restoration
Mine Stabilisation
Send to D-Coded Option, movement recorded on SWOPS
Output Options
Landfill
Mine Storage

APPENDIX B

EXAMPLE OF A PROCESS STATEMENT [COMMERCIALLY CONFIDENTIAL]

APPENDIX C

EXAMPLES OF RECOVERY PROCESSES [COMMERCIALLY CONFIDENTIAL]