**Attachment I.7 Assessment of Impacts of Noise Impacts.**

Facility activities involve the use of plant and equipment that are sources of noise emissions. The results of the most recent monitoring completed in 2016 are discussed in Attachment E5.

The current operations comply with the emission limit values specified in the licence. These were based on the activities authorised under the current licence and whose noise output levels were in excess of 100dB(A). The outputs from the proposed bagging plant will not exceed 80dB(A). Therefore, the proposed change will not give rise to noise emissions that will breach the current emission limit values.

**Attachment I .1 Assessment of Atmospheric Emissions**

Existing Conditions

The EU Air Quality Framework Directive (96/62/EC) requires Member States to identify 'Zones' and 'Agglomerations' for air quality assessment purposes. In Ireland, four zones, A, B, C and D are defined in the *Air Quality Standards (AQS) Regulations* (S.I. No 180 of 2011).

- Zone A – Dublin Conurbation
- Zone B – Cork Conurbation
- Zone C – Large Towns with a Population > 15,000
- Zone D – Remaining Area of Ireland

Greenogue Business Park is in Zone A. The EPA implements an air quality monitoring programme at a number of stations in Dublin, including one at Tallaght which is considered representative of air quality at the site. The Tallaght station conducts continuous monitoring for Sulphur dioxide and $PM_{10}$, and the results indicate the air quality is good.

The current Waste Licence requires routine monitoring of dust deposition levels at four locations within the site boundary. The results of the monitoring carried out in 2016 and to date are in Attachment E1.

In September 2016 the result for D-3 (1,591 mg/m2/day) exceeded the dust deposition limit, however, the inorganic particulate faction of the sample which is representative of site activities was 191 mg/m2/day which is below the limit. The sample was impacted greatly by the presence of vegetative growth (leaves, algae, etc.), which was not derived from site based activities. The exceedance was reported to the Agency.



Statement on Main Polluting Substances

Emissions of main polluting substances (as defined in the Schedule of EPA (Industrial Emissions) (Licensing) Regulations 2013, S.I. No. 137 of 2013) to the atmosphere are not likely to impair the environment.

Assessment of Impacts

Dust and odours are not an issue at the installation, and the current and proposed mitigation measures will ensure that dust will not be a source of nuisance outside the site boundary.

**Attachment I.2 Assessment of Impacts on Receiving Surface Water.**

Existing Conditions

The site lies within the catchment of the Griffeen River, whose main channel flows in a broad south west to north east direction approximately 300 m east of the site, eventually joining the River Liffey near Lucan.

The Griffeen River has been realigned in recent times to facilitate development along its course. An open drain flows along the northern boundary of the site before joining the main channel to the east of the site.

The Griffeen River is part of the IE_EA_Liffey Water Management Unit (WMU) designated in the ERBD Management Plan prepared under the EU Water Framework Directive (WFD). The WMU comprises various Water Bodies and the site is in the Griffeen Lower River Water Body.

Reports have been prepared on the 'Status' of each water body. Status means the condition of the water in a watercourse and is defined by its ecological and chemical status, whichever is worse. Water bodies are ranked in one of five classes, High, Good, Moderate, Poor and Bad. The WFD requires measures to ensure waters achieve at least 'Good Status' by 2015 and that their current status does not deteriorate. Where necessary, for example in heavily impacted or modified watercourses, extended deadlines (2021 and 2027) can be set for achieving the following objectives:

- Prevent Deterioration
- Restore Good Status
- Reduce Chemical Pollution
- Achieve Protected Areas Objectives



The objectives for particular watercourses are based on Pressure and Impact Assessments of human activity, including point and diffuse emissions, land use and morphological conditions on surface waters to identify those water bodies that are 'At Risk' of failing to meet the WFD objectives.

The Griffeen Lower Water Body Status Report states that the overall status is 'Bad', and is considered 'At Risk' of not achieving its restoration objective of at least 'Good' status by 2027.

There are two separate internal surface water drainage systems. The first collects the rainwater run-off from the building roof and this is discharged via a 180m$^3$ flow attenuation tank. The second collects rainwater run-off from paved areas and weighbridge and this is passed through a Class 1 oil interceptor before entering the attenuation tank.

The outflow from the attenuation tank is regulated by a'hydrobrake' and there is an electrically and manually activated shut-off valve between the 'hydrobrake' and the connection to the sewer. The storm sewer connects to the site's foul sewer and the combined flow enters the fouls sewer that serves the Business Park sewer.

Statement on Main Polluting Substances

Emissions of main polluting substances (as defined in the Schedule of EPA (Industrial Emissions) (Licensing) Regulations 2013, S.I. No. 137 of 2013) to surface waters are not likely to impair the environment.

Compliance with EC Environmental Objectives (Surface Waters) Regulations 2009, S.I. No. 272 of 2009.

The activity complies with the requirements of the EC Environmental Objectives (Surface Waters) Regulations 2009, S.I. No. 272 of 2009.

Assessment of Impacts

The proposed development does not include any material changes to the site that will have any effect on the surface water drainage system. Therefore, the proposed development will have no impact on surface water.

**Attachment I.3 Assessment of Impact of Sewage Discharge.**

Existing Conditions

The facility is designed to collect wastewater (foul) from floor wash downs in the warehouse building and discharge to it to the municipal sewer that serves the industrial estate. However, as putrescible wastes are not accepted at the facility and floor wash downs are not required, there is no process wastewater discharge to sewer relating to the activity. There is a drain gate valve on the foul sewer that can be manually activated to stop the flow in the event of an incident inside the warehouse.

Surface water run-off from the entire installation dishcarges to the Irish Water foul sewer via an oil interceptor and flow attenuation tank. Sanitary wastewater generated at the site discharges to the Irish Water foul sewer.

Assessment of Impacts

Schedule D of the Licence requires the sampling of the wastewater discharge (recovered wastes storage bay floor wash downs and vehicle wash) to the municipal sewer; however process wastewater is not generated.

Monitoring of the discharge of the surface water to the foul sewer is carried out quarterly at one location (SW-1) which is an inspection chamber upstream of the connection to the foul sewer. The parameters are pH, electrical conductivity and Chemical Oxygen Demand (COD). There are no emission limit values (ELVs) set in the Licence, but trigger (warning and action) levels have been developed and the monitoring has confirmed that all of the parameters are below respective warning levels.



Compliance with Article 15 of the IED Directive.

The current licence has set emission limit values for process wastewater. The monitoring of the surface water run-off discharge to the foul sewer has confirmed that the emission will not result in any adverse environmental impact.

**Attachment I.6 Assessment of the Environmental Impact of On-Site Waste Recovery/Disposal.**

The majority of the wastes accepted at the facility are processed and transferred for recovery, with a minority going for disposal. No wastes are disposed of at the site. The environmental monitoring conducted in accordance with the licence conditions confirms that the waste recovery operations carried out at the installation generally comply with the relevant emission limits values. These limits are designed to ensure that the waste activities do not either result in any adverse environmental impact, or give rise to nuisance or impairment of amenities outside the site boundaries.

**Attachment I.8 Environmental Considerations, Main Alternatives and BAT**

The installation location is well suited for the recovery and recycling of wastes for the following reasons:

- Located off the M7 National Primary Route that facilitates easy access to the Dublin Port via the M50 and Dublin Port Tunnel, and easy access from the Poolbeg Waste to Energy (WtE) facility;
- Site size is more than adequate to accommodate the scale of the activities;
- The waste recovery activities are compatible with the Land Zoning and the current land use in the surrounding area
- Existing ground conditions (soil type/geology/hydrology) and distances from sensitive environmental receptors minimise the risk of unexpected emissions given rise to pollution

Alternatives

The original EPA inspector's report for the WtE facility (Ref. No. W0232-01, 21 June 2007) states that the Flue Gas Treatment Residues are expected to be classed as hazardous and will be sent off site for disposal in an approved hazardous waste facility (p.11). It further states that if suitable landfill is not available in Ireland for the unrecoverable residues, then export of the residues will be necessary.

While the disposal of the APCR nationally is considered the preferred option, following the decision to refuse the Murphy Hollywood application for a hazardous waste landfill to accept the residues, the option for disposal nationally is not currently available in Ireland.



BAT

The design and method of operation of both the existing facility and proposed development are based on the requirements of the European Commission's Reference Document on Best Available Techniques for the Waste Treatment Industries 2006 (BREF), which specifies the Best Available Techniques (BAT) for Waste Management Facilities.

*BREF*

The BREF addresses design, operational and procedural matters, including efficient processing, waste acceptance, emission controls and environmental management systems (EMS). Section 2.1 describes the Common Techniques that are applied in the sector. It requires the provision of appropriate waste reception and acceptance measures (2.1.1); appropriate management techniques (2.1.2); energy systems (2.1.3); storage and handling measures (2.1.4); blending and mixing (2.1.5); facility decommissioning (2.16) and baling (2.1.9).

*Existing BAT Measures*

Condition 2 of the current licence requires RILTA to develop and implement an EMS for the facility. It requires the preparation of operational control procedures for all waste activities

and ensure that facility staff are provided with the appropriate skills and training to perform their assigned functions.

*BAT Review*

For the purposes of this licence review, three BAT Documents have been consulted, namely:

a) Reference document of Best Available Techniques for the Waste Treatments Industries (2006);
b) Reference of Best Available Techniques for Waste Incineration (2006)' and
c) Reference document of Best Available Techniques on Emissions from Storage (2006)
d)

BAT for Waste Treatments 2006 (Pg. 68) states the following:

> *A technique in large-scale use, includes the curing of fly ash with aqueous neutral or acidic liquors to give a granular output prior to landfill.*

The proposed recovery of the APCR for the reinstatement of a quarry in Langoya Island in Norway is intended to meet this BAT principle.

BAT on Emissions from Storage (Pg. 216) states the following with regard to large volume silos in order to minimise dust from storage:

> *'Silos are generally used to protect the product against external input (e.g. rain) or to avoid losing valuable product. They are also commonly applied when the solid material is a powder or contains a sufficient quantity of dust which can cause a significant environmental impact. Examples of bulk materials that are stored in silos when they are in powder or pulverised forms are: FGD-gypsum, potato starch, finely crushed limestone, fly ash, fertiliser and pulverised coal.*
>
> *Driving force for implementation: The use of silo systems is suitable in those cases where only small storage areas are available, the storage capacities are limited and the requirements for preventing emissions are relatively high'.*



The closed process for offloading to silos and all other control measures described in the "Detailed Report on Requested Changes to W0185-01" document in Attachment D.1 are intended to meet this BAT principle of preventing emissions by using such large volume silo structures and associated infrastructure.

There is no specific reference to the bagging and transport of the APCR in the BAT on Waste Incineration, but it is part of the train of events leading to the appropriate recovery/disposal of the materials.

Risk of Pollution

The facility design and method of operation take BAT into consideration. The facility when operated in accordance with the Licence conditions, which includes compliance with the emission limit values, will not give rise to significant pollution.

Waste Production

The facility operations generate relatively small quantities of waste, primarily office and canteen. Rilta has a source segregation policy designed to ensure that the maximum possible amount of these wastes are recycled/recovered.

Energy and other Resource Consumption;

Details on energy efficiency measures and resource consumption are described in Section G of the Licence Application.

Measures to prevent accidents and limit their consequences;

The measures to prevent accidents and limit their consequences are described in Section J of the Licence Application.

Measures to be taken upon definitive cessation of activities to avoid any pollution risk and return the site of operation to a satisfactory state;

These measures are detailed in Section K of the Licence Application.

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ENVIRONMENTAL MANAGEMENT FOR BUSINESS

# BASELINE ASSESSMENT REPORT

## RILTA ENVIRONMENTAL LTD.

## SITE 14-A1 GREENOGUE BUSINESS PARK

## LICENCE NO. W0185-01



**Prepared For: -**

RILTA Environmental Ltd,
Site No. 14 A1 Greenogue Business Park,
Rathcoole,
County Dublin.

**Prepared By: -**

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**July 2017**

| | |
|---|---|
| Project | Baseline Assessment Report<br>Rilta Environmental Ltd Greenogue |
| Client | Rilta Environmental Ltd<br>W00185-01 |

| Report No | Date | Status | Prepared By | Reviewed By |
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| 1950101 | 07/17/2017 | Initial | Neil Sandes<br>BSc PGeo | Jim O'Callaghan<br>MSc, CEnv,<br>MCIWM, IEMA |
| | 12/07/2017 | Final | | |
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# 1. INTRODUCTION

RILTA Environmental Limited (RILTA) operates an Integrated Waste Management Facility at Site No 14 A1, Greenogue Business Park, Rathcoole, County Dublin under an Industrial Emissions Licence (W0185-01) granted by the Environmental Protection Agency (Agency).

RILTA is applying to the Agency for a review of the licence and a 'Baseline Report' has been prepared in accordance with section 86B of the EPA Act 1992. The purpose of the report is to determine the state of soil and groundwater contamination at the installation.

## 1.1 Methodology

OCM's assessment was based on the reports on soil investigations carried out at the site prior to the construction of the existing buildings and the results of the on-going groundwater monitoring programed conducted in compliance with the requirements of the current licence.

# 2. STAGE 1 & 2 HAZARDOUS SUBSTANCE

## 2.1 Stage 1 Hazardous Substances Currently Used, Produced and Released

Previous operations involved the storage and packaging of a range of hazardous waste that included, amongst others, acids, bases, organic solvents and waste oils. Current operations involve the handling and storage of transformer oil and batteries. The proposed APCR has the potential to leach out metals.

## 2.2 Stage 2 Relevant Hazardous Substances

The hazardous substances of relevance to the baseline conditions are the pollutants associated with the range of hazardous waste that have previously been handled at the installation, are current accepted and those that will be accepted in the future.

# 3. SITE SPECIFIC POLLUTION POSSIBILITY

## 3.1 Installation Location and Layout

The installation is located in the Greenogue Business Park, approximately 1.5km east of Newcastle. The site 0.5ha and there are three adjoining buildings-Warehouse, Chemical Store and the Offices. There is a weighbridge at the site entrance and a covered Tanker Bay. There is a redundant backup generator in a bund in the north-eastern corner of the site. The open yards (2,760m$^2$) are paved with a 120mm reinforced concrete slab.

## 3.2 Installation Activities

The installation is authorised to accept up to 60,000 tonnes of waste comprising 27,000 tonnes of non-hazardous household, commercial and industrial, construction and demolition wastes, and 33,000 tonnes of hazardous waste.

The initial activities included the storage and repackaging of waste materials in three separate areas which were:



*Chemical Store*

The building has three separate compartments that were used to store hazardous packaged materials.

*Warehouse*

The warehouse was used for the repackaging and the storage of waste materials. The repacking included:

i. shredding, baling and drumming
ii. manual dismantling of waste electrical goods
iii. manual removal of components of certain waste goods
iv. bulking of compatible liquids into drums

Storage areas were provided for baled paper and plastics, baled metals and WEEE.

*Tanker Bay*

Road-going bulk tankers and ISO tanks containing liquid hazardous waste were parked in a covered and bunded bay that can accommodate three bulk road tankers.

Over time and in response to commercial requirements the waste activities changed. Current waste activities include the acceptance and processing of electrical transformers, the storage of batteries and overnight parking of articulated trailers transporting refrigerators.

All processing is carried out inside the warehouse. The transformers are stored in steel spill containment trays pending the removal of the coolant oil which is stored in IBCs in one of the compartments inside the Chemical Store

After the oil has been removed, the transformers are then placed on a steel platform that has integral spill containment where an angle grinder is used to remove the copper components. The metals are stored inside the warehouse pending shipment to overseas smelters via an authorised intermediary.

The batteries are delivered to the installation in crates, where they are stored inside the warehouse pending the build-up of enough stock for onward transfer to overseas recycling plants. Refrigerators collected WEEE drop off centres arrive in articulated trailers which are temporarily parked at the facility pending the completion of the appropriate documentation before they are sent to RILTA's sister company in Northern Ireland for processing.

Empty packaging is stored in the second compartment in the Chemical Store, while the third is empty. The Tanker Bay is used to store clean, empty product drums.

It is proposed to install a bagging plant and associated pallet racking for the storage and transfer of air pollution control residues (APCR) from a Waste to Energy (WtE) facilith. The bagging plant will comprise

- Three storage silos, with a combined capacity of 525m$^3$;
- A pressure transfer system;
- Two bulk bag loading systems (one duty and one stand-by), and a
- Pallet racking system



It is estimated that approximately 30,000 tonnes of APCR will be accepted, bagged and temporarily stored at the installation annually. The APCR will be delivered in road tankers. The tankers will drive into the Warehouse where the residues will be pneumatically transferred into the storage silos located in the south-west corner of the building.

The APCR will be discharged from the silos into the duty bagging unit where flexible intermediate containers (FIBCs) or bulk bags will be filled. The bags will then be stored on the racking until such time as they are transferred from the installation by articulated trailer.

### 3.3 Services

Electricity is provided by a utility company. Water is obtained from the Irish Water mains supply. Sanitary wastewater is discharged to the foul sewer that serves the Business Park. Rainwater run-off from the entire site is discharge to the foul sewer via an oil interceptor and a flow attenuation tank.

## 3.4 Inventory of Raw Materials and Wastes

Diesel is not stored at the site. Currently transformer oil is stored in one of the compartments in the Chemical Store, empty packaging is stored in the second compartment, while the third is empty. The Tanker Bay is used to store clean, empty product drums. The maximum amount materials and wastes on site at any one time are shown in Table 3.3.

**Table 3.3 – Materials Inventory**

| Wastes/Products | Quantity Stored |
|---|---|
| Transformers | 300 Tonnes |
| Ferrous Metals | 60 Tonnes |
| Non-Ferrous Metals | 20 Tonnes |
| Waste Oil | 100 Tonnes |
| Batteries | 200 Tonnes |
| Refrigerators | 25 Tonnes |
| Other WEEE | 25 Tonnes |
| Product Drums | 100 No. |
| Empty Packaging | 2 Tonnes |

RILTA has documented procedures on the handling and storage of potentially polluting substances used at the facility, e.g. transformer oils. The procedures describes how the waste activities should be carried out to minimise the risk of accidental spills and ensure that if these occur there is a rapid and effective response.



## 3.5 Emergency Response

RILTA has prepared and adopted an Accident Prevention Policy and an Emergency Response Procedure (ERP) as specified in Condition 9.2 that specifies roles, responsibilities and actions required to deal quickly and efficiently with all foreseeable major incidents and to minimise environmental impacts.

The buildings are fitted with audible fire alarms. Fixed fire-fighting facilities e.g. fire hydrants and fire hose-reels are provided. Fire water is supplied from the mains supply and there are 2 No. hydrants located around the site.

## 3.6 Risk Mitigation Measures

The licence conditions require the provision of mitigation measures, both infrastructural and procedural, that effectively minimise the risk of environmental liabilities associated with unplanned events. Such measures, which are subject to regular review by RILTA include:

- Provision of an appropriately experienced Facility Management Team and implementation of appropriate staff training programmes;
- Adoption of site specific Accident Prevention Policy and Emergency Response Procedures (ERPs);

- Provision of impermeable concrete surfaces in areas where hazardous substances are stored and handled;

- Provision and maintenance of appropriate spill response and clean-up equipment in areas where there is a risk of spills occurring;

- Regular site inspections.

# 4. SITE HISTORY

## 4.1 Sources

The site history was derived from the reports on a site investigations carried out in 2002 and the EIS prepared as part of the application for planning permission to construct the installation and the waste licence to operate it.

## 4.2 Site History

The part of the Business Park occupied by the installation was initially developed in around 2003. Prior to development the land had been were used for agricultural purposes. The RILTA facility was constructed and started operations under the current licence (W0185-01) in December 2004 which allowed the acceptance of 60,000 tonnes per annum of a combination of hazardous waste, commercial waste, construction and demolition waste, industrial sludges and industrial waste.



## 4.3 Incident History

There have been no incidents (spills, fires, leaks etc) since operations began at the site that had potential to cause soil or groundwater pollution.

# 5. ENVIRONMENTAL SETTING

## 5.1 Hydrology

The installation is located in the catchment of the River Griffeen, which is a tributary of the Liffey, and a culverted tributary of the Griffeen runs along the northern site boundary. The Griffeen joins the Liffey at Lucan approximately 8km north of the site.

## 5.2 Geology

The subsoils beneath the site are between 3 and 5 m thick and comprise grey silty CLAY with cobbles and boulders.

## 5.3 Hydrogeology

The bedrock geology of the site comprises dark grey, fine grained, graded limestones with interbedded black, poorly fossiliferous shales of the Lucan Formation. Based on data obtained from the GSI the bedrock aquifer is a locally important (Ll) aquifer that is productive in local zones. Groundwater yields in the formation range from 5.45 - 9 cubic meters per hour ($m^3$/hr) based on reported yields from wells in the formation. The aquifer vulnerability to pollution from the ground surface is High.



The aquifer is part of the Dublin Area Groundwater Body (IE_EA_G_005). The condition of a groundwater Water Body is defined by its chemical and quantitative status, whichever is worse, and groundwater quality is ranked in one of two status classes: Good or Poor. The Dublin Area Water Body is categorised as being of 'Good' status, but is 'At Risk' of achieving its objective of protecting the existing status. At the time the application was prepared there was no available information on groundwater quality beneath the site.

## 5.4 Designated Sites

There are no Natura 2001 Sites (Special Area of Conservation (SAC) and Special Protected Areas (SPA)) or National Heritage Areas (NHA) within the licensed area and the closest designated site is the Glenasmole Valley SAC, which is almost 10 km to the south-east.

# 6. SITE CHARACTERISATION

## 6.1 Conceptual Site Model

The site is underlain by between 3 and 5 m of natural soils comprising a silty CLAY with gravels and cobbles. The bedrock is the Calp limestone, which comprises dark, grey fine-grained argillaceous limestone. The bedrock is classed as a Locally Important Aquifer that is productive only in local zones (**Ll**). The aquifer vulnerability to pollution from the ground surface is High.

The installation is entirely covered by buildings or concrete paving. Rainwater run-off from building roofs and paved areas is directed to an underground attenuation tank and discharged to the Irish Water foul sewer. Sanitary wastewater also discharges to the Irish Water foul sewer.

## 6.2 Soil Quality

Prior to the construction of the existing installation a baseline soils assessment was carried out. It comprised the excavation of two trial pits and the collection of four soil samples. The samples were field screened for Volatile Organic Compounds (VOC) and then sent to the laboratory for analysis a range of organic and inorganic parameters that included pH, metals, fluoride, cyanide, petroleum hydrocarbons, benzene, ethylbenzene, toluene, xylene, polyaromatic hydrocarbons (PAH), VOC and organochlorine pesticides.



The results are included in the report on the investigation that formed part of the EIS submitted with the application for the original licence. The results are considered to be indicative of the baseline soils conditions. A copy of the report is in Appendix 1.

## 6.3 Groundwater Quality

There are two groundwater monitoring wells on site (GW-1 and GW-2). GW-1 is in the southern section of the site and is upgradient of GW-2, which is in the northern end of the site. Monitoring is carried out quarterly. The parameters analysed quarterly are pH, electrical conductivity, temperature, dissolved oxygen, chloride, sulphate, Total Organic Carbon. In addition to the quarterly parameters monitoring of List I/II Organic Substances and dissolved metals are carried out annually.

The results of the annual monitoring carried out in 2016 are in Table 6.1. RITLA has prepared warning and trigger action levels based on the monitoring data from 2010 to 2015 and submitted these to the OEE. As the trigger levels have not yet been approved, the Tables include the EPA Interim Guideline Values (IGVs) on groundwater quality and the Groundwater Regulation Threshold Values (TV) for comparative purposes.

The IGVs are not statutory guidelines but have been prepared by the EPA to assist in the assessment of impacts on groundwater quality in the context of the implementation of the Water Framework Directive. The TVs were introduced in 2010 (S.I. 9 of 2010) on foot of requirements from the Water Framework Directive and have evolved from the IGVs.

The IGV represent typical background or unpolluted conditions; however levels higher than the IGV may occur naturally depending on the local geological and hydrogeological conditions.

While the TVs are more appropriate for large scale abstraction wells used for potable supply, they can be used to assess the significance of contamination where present in non-potable groundwater supplies. Because not all parameters monitored have been assigned a TV, the relevant IGV continues to be used for comparative purposes.

**Table 6.1 Groundwater Monitoring Results 2016**

| Parameter | Unit | GW-1 Up Gradient | GW-2 Down Gradient | IGV | TV |
|---|---|---|---|---|---|
| Boron | µg/l | 18 | 20 | **1,000** | **750** |
| Cadmium | µg/l | <0.5 | <0.5 | **5** | **3.75** |
| Calcium | mg/l | 124.9 | 181 | **200** | **-** |
| Copper | µg/l | <7 | <7 | **30** | **1,500** |
| Iron | µg/l | <20 | <20 | **200** | **-** |
| Lead | µg/l | <5 | <5 | **10** | **18.75** |
| Magnesium | mg/l | 8.9 | 14 | **50** | **-** |
| Manganese | µg/l | 511 | 40 | **50** | **-** |
| Nickel | µg/l | 3 | <2 | **20** | **15** |
| Potassium | mg/l | 0.9 | 2.1 | **5** | **-** |
| Zinc | µg/l | <3 | <3 | **100** | **-** |
| Sulphate | mg/l | 96.81 | 185.52 | **200** | **187.5** |
| Chloride | mg/l | 17.5 | 48.4 | **30** | **187.5** |
| Dissolved Oxygen | mg/l | 6 | 7 | **NAC** | **-** |
| Electrical Conductivity | µS/cm | 673 | 1,118 | **1,000** | **875 – 1,875** |
| pH | pH units | 7.10 | 7.16 | **6.5-9.5** | **-** |
| Total Organic Carbon | mg/l | <2 | <2 | **NAC** | **-** |
| VOC | µg/l | ND | ND | **-** | **-** |
| sVOC | µg/l | ND | ND | **-** | **-** |

APPENDIX 1

**Soil Sampling Report**

# SOIL SAMPLING REPORT

# FOR

# WASTE TRANSFER STATION

# GREENOGUE INDUSTRIAL ESTATE



## REVISION CONTROL TABLE

**User is Responsible for Checking The Revision Status Of This Document**

| Rev Nr. | Description of Changes: | Prepared by: | Checked by: | Approved by: | Date: |
|---|---|---|---|---|---|
| 0 | Issue to Client | PL | | | 23/05/02 |

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# 1. INTRODUCTION

## 1.1. Introduction

Fehily Timoney & Co. (FTC) was retained by Cara Environmental Technology Ltd. (CARA) to determine background concentrations of chemical parameters in soil at a proposed hazardous waste transfer station at Greenogue Industrial Estate, Co. Dublin.

## 1.2. Site History

The entire facility will be located on a 0.25 ha site. This site forms part of the extension to the Greenogue Industrial Estate, previously agricultural land.



## 1.3. Proposed Development Overview

The development will comprise site preparation and the erection of a transfer station, an ancillary storage and office buildings. The proposed transfer station is designed to be capable of handling 57,000 tonnes of waste per annum of which 30,000 tonnes will be hazardous waste while the remaining 27,000 will be non-hazardous. There will be no public access to the site. All wastes delivered to the site will be from approved, permitted waste contractors.

- The site of the proposed development is located within the extension to the Greenogue Industrial Estate and is accessed via a regional road, the R120, linking Rathcoole and Newcastle. An existing road servicing the Greenogue Industrial Estate will be used as the access road to the site.

The site location is shown in Figure 1 of the main EIS.

# 2. METHODOLOGY

## 2.1. Trial Pit Excavations

Two trial pits were dug using a back-hoe excavator. The trial pit locations were randomly chosen after a walkover of the site.

Two soil samples were taken at each trial pit, one at between 0.1—0.3 m below ground level (bgl) and the other at between 3.0-3.2 m bgl.

At each of the trial pit locations, a flame ionisation detector (FID) was used to screen the soil samples for the presence of volatile organic compounds (VOCs). The presence of VOCs were not recorded during the excavation of any of the trial holes. Odour from the soil samples, if any, was also recorded.

Samples were collected in laboratory prepared containers and delivered by hand on the same day to the analytical laboratory. A chain of custody form accompanied the samples to the laboratory.



## 2.2. Soil Analysis

Although the site was previously used for agricultural use, the purpose of the investigation was to determine the background concentrations of chemical parameters within the ground. The site investigation would also reveal if any imported material had been brought to the site.

Soil samples were analysed for parameters as outlined in the *Dutch List* and U.K. guidelines.

## 2.3. *Dutch List* and UK Guidelines (ICRCL)

At present there are no Irish or EU soil contamination or clean up standards. However, the two sets of guidelines that are generally used include the *Dutch List* and the UK Inter Departmental Committee on the redevelopment of contaminated land (ICRCL) list.

The *Dutch List*

- The *Dutch List* of parameters for the assessment of soil contamination is a comprehensive set of standards devised by the Dutch Government. Contamination assessment is based on two categories, as follows:

1. Soil optimum levels, which are considered to be background levels.

2. Action levels, which, if exceeded indicate that serious soil contamination is present. Further investigations may be required to determine the urgency of clean up.

The *Dutch List* approach to soil contamination endeavours to clean up sites to a degree, which allows long-term flexibility for site use.



ICRCL

- The Inter-Departmental Committee on the Redevelopment of Contaminated Land (ICRCL) list is in standard use in the UK and considers an end-use approach to clean-up standards. The degree and type of remediation are tailored to the end-use proposed for the site. Threshold and action trigger concentrations proposed by the ICRCL enable the significance of the contamination to be decided and the need for remedial action to be determined. Emphasis is placed on samples, which have shown greatest contamination. Consistently high values from several samples may suggest the presence of extensive contamination. A single isolated 'hotspot' would not normally mean that remedial treatment for the whole site is necessary.

The *Dutch List* and ICRCL limits are detailed in Section 3.

# 3. RESULTS

On site screening of the samples for volatile organic compounds was conducted at trial pit locations TP1 and TP2. Results of the screening are presented in Table 3.1.

**Table 3.1: Volatile Organic Screening Results**

| Trial Hole | Depth Below Existing Ground Level (M) | FID Readings (<PPM)* | Odour |
|---|---|---|---|
| TP1 | 0.1-0.3 m | <1 | None |
| | 2.0 m | <1 | None |
| TP2 | 0.1-0.3 m | <1 | None |
| | 2.0 m | <1 | None |

* ppm as methane



The results of soil sample analysis are summarised in Table 3.2 and the complete set of results is provided in Appendix A of this report.

**Table 3.2: Summary of Soil Sample Analysis**

| Parameter | *Dutch List* Soil Quality Criteria | | ICRCL Note 1 (mg/kg) | | Sample ID and Depth interval and Results | |
|---|---|---|---|---|---|---|
| | Optimum | Action | Threshold | Action | TP1 (0.3 m) | TP2 (0.3 m) |
| pH | -- | -- | Note 2 | -- | 8.94 | 8.64 |
| Arsenic mg/kg | 29 | 55 | 40 | -- | 26 | 42 |
| Chromium mg/kg | 100 | 380 | 1,000 | -- | <1 | <1 |
| Copper mg/kg | 36 | 190 | 130 | -- | 11 | 12 |
| Nickel mg/kg | 35 | 210 | 70 | -- | 15 | 18 |
| Lead mg/kg | 85 | 530 | 2,000 | -- | 22 | 18 |
| Zinc mg/kg | 140 | 720 | 300 | -- | 64 | 69 |
| Barium mg/kg | 200 | 625 | -- | -- | 56 | 126 |
| Cobalt mg/kg | 100 | 380 | -- | -- | 5 | 7 |
| Molybdenum mg/kg | 10 | 200 | -- | -- | <1 | <1 |
| Cadmium mg/kg | 0.8 | 12 | 15 | -- | 1.4 | 2.2 |
| Mercury mg/kg | 0.3 | 10 | 20 | -- | <0.3 | <0.3 |
| Cresols mg/kg | -- | 5.0 | -- | -- | <0.01 | <0.01 |
| Total Phenols mg/kg | 0.05 | 40.0 | 5 | 1,000 | <0.01 | <0.01 |
| Xylene mg/kg | 0.05 | 2.5 | -- | -- | <0.01 | <0.01 |
| Antimony mg/kg | -- | -- | -- | -- | <1 | <1 |
| Iron mg/kg | -- | -- | -- | -- | 11,520 | 17,360 |
| Titanium mg/kg | -- | -- | -- | -- | 19 | 22 |
| Fluoride mg/kg | -- | -- | -- | -- | 1.5 | 2.7 |
| Total Cyanide mg/kg | 5 | 50 | -- | -- | <2.5 | <2.5 |
| Thiocyanate mg/kg | -- | -- | -- | -- | <1 | <1 |
| Free Cyanide mg/kg | 1 | 20 | -- | -- | <2.5 | <2.5 |
| Bromide mg/kg | -- | -- | -- | -- | <1 | <1 |

*Note:* *1.* Refers to parks, playing fields and open space (ICRCL 59/83 Trigger Concentrations).

*2.* pH of soil should not fall below 6.5 ph units as toxic effects of uptake of these elements will be increased.

**Table 3.2: Cont'd Summary of Soil Sample Analysis**

| Parameter | *Dutch List* Soil Quality Criteria | | ICRCL [Note 1] (mg/kg) | | Sample ID and Depth interval and Results | |
|---|---|---|---|---|---|---|
| | Optimum | Action | Threshold | Action | TP1 0.3 m | TP2 0.3 m |
| Diesel Range Organics mg/kg [Note 3] | 50 | 5,000 | -- | -- | 44 | 43 |
| Mineral Oil mg/kg | 50 | 5,000 | | | <1 | <1 |
| Benzene mg/kg | 0.05 | 2 | -- | -- | <0.01 | <0.01 |
| Ethylbenzene mg/kg | 0.05 | 50 | -- | -- | <0.01 | <0.01 |
| Petrol Range Organics mg/kg [Note 3] | 50 | 5,000 | -- | -- | <0.01 | <0.01 |
| Toluene mg/kg | 0.05 | 130 | -- | -- | <0.01 | <0.01 |
| Total Xylene mg/kg | 0.05 | 25 | -- | -- | <0.01 | <0.01 |
| Acenaphthene mg/kg | -- | -- | -- | -- | <0.001 | <0.001 |
| Anthracene mg/kg | <1 | <1 | -- | -- | <0.001 | <0.001 |
| Benzo(a)anthracene mg/kg | <1 | <1 | -- | -- | <0.001 | <0.001 |
| Benzo(a)pyrene mg/kg | <1 | <1 | -- | -- | <0.001 | <0.001 |
| Benzo(b)fluoranthene mg/kg | <1 | <1 | -- | -- | <0.001 | <0.001 |
| Benzo(ghi)perylene mg/kg | <1 | <1 | -- | -- | <0.001 | <0.001 |
| Benzo(K)fluoranthene mg/kg | <1 | <1 | -- | -- | <0.001 | <0.001 |
| Chrysene mg/kg | <1 | <1 | -- | -- | <0.001 | <0.001 |
| Dibenzo(ah)anthracene mg/kg | <1 | <1 | -- | -- | <0.001 | <0.001 |
| Fluoranthene mg/kg | <1 | <1 | -- | -- | <0.001 | <0.001 |
| Fluorene mg/kg | <1 | <1 | -- | -- | <0.001 | <0.001 |
| Indeno(123cd)pryene mg/kg | <1 | <1 | -- | -- | <0.001 | <0.001 |
| Naphthalene mg/kg | <1 | <1 | -- | -- | <0.001 | <0.001 |
| Penanthrene mg/kg | <1 | <1 | -- | -- | <0.001 | <0.001 |
| Pyrene mg/kg | <1 | <1 | -- | -- | <0.001 | <0.001 |
| Total 16 (EPA) PAH mg/kg [Note 4] | 1 | 40 | -- | -- | <0.001 | <0.001 |

*Note:* 3. DRO's and PRO's are compared to *Dutch list* criteria for mineral oil

4. *Dutch List* limits are for the sum of 10 PAH's. The laboratory results are expressed as the sum of 16 PAH's.

### 3.1. Results

The results of soil sample analysis are summarised in Table 3.2 and the full set of results is provided in Appendix A.

Polycyclic Aromatic Hydrocarbons (PAHs)

The *Dutch List* gives a total PAH optimum limit of 1mg/kg and an action limit of 40mg/kg for soils. The total PAH means the sum of the following PAH's:

- anthracene,
- benzo(a)anthracene,
- benzo(k)flouroanthene,
- benzo(a)pyrene,
- chrysene,
- phenantrene,
- flouroanthene,
- indeno(1,2,3-cd) pyrene,
- naphthalene and
- benzo(g,h,i)perylene.



The results shown in Table 3.2 indicate that the levels of PAHs (for 16 compounds) detected in the samples are below the optimum levels (1mg/kg) given for the *Dutch List* optimum concentration.

Phenols and Cresol

The levels of phenols detected in the trial holes were less than the method limit of detection (0.01 mg/kg). Cresol levels in all the trial holes were below the method limit of detection of <0.01mg/kg. These results fall below the *Dutch List* action level of 5mg/kg. There is no optimum limit given in the *Dutch List.*

Diesel and Petrol Range Hydrocarbons (DROs and PROs)

Results of PROs for TP1 and TP2 were below the limit of detection of 10mg/kg. Although the *Dutch List* does not have a limit for DROs, a limit for mineral oil does exist and the levels in the soil samples can be adequately compared to this standard.

The *Dutch List* standard for mineral oil includes the sum of all of the alkanes both straight-chained and branched-chained. Many of these are found in petroleum hydrocarbons. The levels of diesel and petrol range organics are within the *Dutch List* optimum level for mineral oil.

## Metals

Heavy metal analysis carried out on the samples revealed that the levels detected are below the *Dutch List* optimum levels for the corresponding metals with the exception of:

- Arsenic concentration of 42 mg/kg (TP1)
- Cadmium concentrations of 1.4 mg/kg (TP1) and 2.2 mg/kg (TP2)

With the exception of arsenic at TP2 (42 mg/kg concentration against a threshold concentration of 40 mg/kg), the ICRCL threshold values are not exceeded at any trial pit concentrations for the metals analysed.

Results show that iron concentrations at the sampling locations are elevated. Other metals also detected but below the *Dutch List* optimum levels are:

- Copper
- Nickel
- Lead
- Zinc
- Barium
- Cobalt
- Titanium



## Volatile Organic Compounds (VOC)

VOC analysis was carried out on samples TP1 and TP2. Results are presented in Appendix A of this report. Results show that concentrations of compounds tested are below the limits of detection of 1 µg/l. Results of the spiked blank and calibration standard are also shown in Appendix 1.

## Organochlorine Pesticides

A total of twenty-eight organochlorine pesticides were analysed for at TP1 and TP2. All compounds were below the limits of detection of 1 µg/l. Results are shown in Appendix A.

# Conclusions on BAT from the Waste Treatment BAT Reference Document

## READ ME:

The '*Conclusions on BAT from the Waste Treatment BAT Reference Document'* is a vertical BREF that covers activities for a number of waste (hazardous and non-hazardous) treatments and deals with common waste treatments, biological and physico-chemical treatments of waste, treatments to recover waste materials and treatment to produce solid and liquid fuels from waste.

For each BAT, in the following table, state whether it is applicable to your installation and describe how each BAT applies or not to your installation and provide information on your compliance with the requirement.

It may be useful to first identify all the **'No'** BATs and provide your reasoning in the **'Applicability Assessment'** box as to why you consider this particular BAT is No at/to your entire installation having regard to the scope/ definitions, general considerations and the information on applicability. (You may need to make reference to relevant processes/activities or individual emission points to provide a comprehensive response).

Please use the '**Scope**' box to describe the relevant activities/processes that come within the scope of this BREF.

For each applicable BAT, in the following table, state the status; **'Yes'** or **'Will be'** as appropriate in the '**State whether it is in place or state schedule for implementation**' box. The use of each of these terms is described below.

Information on compliance in the '**Applicability Assessment**' box should include, where applicable, the following:

(i) Identification of the relevant process/ activity or individual emission points that the BAT requirement applies to at your installation;

(ii) Where BAT is to use one or a combination of listed techniques, specify the technique(s) implemented/proposed at your installation to achieve the BAT; and

(iii) A comment on how the requirements are being met or will be met, e.g., a description of the technology/operational controls/management proposed to meet the requirements.

Use of terms:

(a) '**Yes**' – To be entered where the installation is currently complaint with this BAT requirement.

(b) '**Will be**' – To be entered where a further technique is required to be installed to achieve compliance with the BAT requirement. In this case you must also specify the date by which the installation will comply with the BAT Conclusion requirement.

Please refer to the EPA BAT Guidance Note for the Waste Sector for BAT associated emission levels. The EPA BAT Guidance Note is the reference for setting emission limit values (without prejudice to the requirements of environmental quality standards).

BAT Guidance Notes are available on the EPA website and the waste guidance note is hyperlinked as follows:

BAT Guidance Note – Waste Sector (Transfer & Materials Recovery)

## Conclusions on BAT from the Waste Treatment BAT Reference Document (extracts)

The full and complete Waste Treatment BAT reference document (August 2006) is available at the EIPPC Bureau website:
http://eippcb.jrc.ec.europa.eu/reference/

SCOPE

*Identify here the particular processes and activities at the installation that come within the scope of the conclusions on BAT in the Waste Treatment BAT reference documents (BREF).*



| BAT No. | BAT Description | Applicability Assessment<br>State "applicable" if the technique applies to your installation.<br>State "No" if not, and provide a comprehensive explanation[1]. | Status of technique at installation<br>If applicable, state "in place" if the technique is in place at your installation.<br>If not, state "not in place", the date it will be in place and a comprehensive explanation[1]. |
|---|---|---|---|
| | **5.1 Generic BAT** | | |
| | **Environmental Management**<br>These are techniques related to the continuous improvement of environmental performance. They provide the framework for ensuring the identification, adoption and adherence to BAT options that nevertheless remain important and can play a role in improving environmental | | |

[1] If necessary, use attachments numbered according to the relevant BAT, e.g. "Attachment BAT 1".

| BAT No. | BAT Description | Applicability Assessment<br>State "applicable" if the technique applies to your installation.<br>State "No" if not, and provide a comprehensive explanation[1]. | Status of technique at installation<br>If applicable, state "in place" if the technique is in place at your installation.<br>If not, state "not in place", the date it will be in place and a comprehensive explanation[1]. |
|---|---|---|---|
| | performance of the installation. Indeed, these good house housekeeping/management techniques/tools often prevent emissions.<br>A number of environmental management techniques are determined as BAT. The scope (e.g. level of detail) and nature of the Environmental Management System (EMS) (e.g. standardised or non-standardised) will generally be related to the nature, scale and complexity of the installation, and the range of environmental impacts it may have. BAT is to (**1** to **5**): | | |
| **1** | Implement and adhere to an EMS that incorporates, as appropriate to individual circumstances, the following features (see Section 4.1.2.8 of BREF). | Yes | In Place |
| **1a** | (a) Definition of an environmental policy for the installation by top management (commitment of the top management is regarded as a precondition for a successful application of other features of the EMS). | Yes | In Place |
| **1b** | (b) Planning and establishing the necessary procedures. | Yes | In Place |
| **1c** | (c) Implementation of the procedures, paying particular attention to:<br>• structure and responsibility;<br>• training, awareness and competence;<br>• communication, employee involvement;<br>• documentation; | Yes | In Place |

| BAT No. | BAT Description | Applicability Assessment<br>State "applicable" if the technique applies to your installation.<br>State "No" if not, and provide a comprehensive explanation[1]. | Status of technique at installation<br>If applicable, state "in place" if the technique is in place at your installation.<br>If not, state "not in place", the date it will be in place and a comprehensive explanation[1]. |
|---|---|---|---|
| | • efficient process control;<br>• maintenance programme;<br>• emergency preparedness and response;<br>• safeguarding compliance with environmental legislation. | | |
| **1d** | (d) Checking performance and taking corrective action, paying particular attention to:<br>• monitoring and measurement (see also the Reference document on General Principles of Monitoring);<br>• corrective and preventive action;<br>• maintenance of records;<br>• independent (where applicable) internal auditing in order to determine whether or not the environmental management system conforms to planned arrangements and has been properly implemented and maintained. | Yes | In Place |
| **1e** | (e) Review by top management | Yes | In Place |
| **1f (not mandatory)** | (f) Having the management system and audit procedure examined and validated by an accredited certification body or an external EMS verifier. | Yes | In Place |

| BAT No. | BAT Description | Applicability Assessment<br>State "applicable" if the technique applies to your installation.<br>State "No" if not, and provide a comprehensive explanation[1]. | Status of technique at installation<br>If applicable, state "in place" if the technique is in place at your installation.<br>If not, state "not in place", the date it will be in place and a comprehensive explanation[1]. |
|---|---|---|---|
| **1g (not mandatory)** | (g) Preparation and publication (and possibly external validation) of a regular environmental statement describing all the significant environmental aspects of the installation, allowing for year-by-year comparison against environmental objectives and targets as well as with sector benchmarks as appropriate. | Yes | In Place |
| **1h (not mandatory)** | (h) Implementation and adherence to an internationally accepted voluntary system such as EMAS or EN ISO 14001:1996. This voluntary step could give higher credibility to the EMS. In particular EMAS, which embodies all the above-mentioned features, gives higher credibility. However, non-standardised systems can in principle be equally effective provided that they are properly designed and implemented. | Yes | In Place |
| **1i (not mandatory)** | (i) Giving consideration to the environmental impact from the eventual decommissioning of the unit at the stage of designing a new plant. | Yes | In Place |
| **1j (not mandatory)** | (j) Giving consideration to the development of cleaner technologies. | Yes | In Place |

| BAT No. | BAT Description | Applicability Assessment<br>State "applicable" if the technique applies to your installation.<br>State "No" if not, and provide a comprehensive explanation[1]. | Status of technique at installation<br>If applicable, state "in place" if the technique is in place at your installation.<br>If not, state "not in place", the date it will be in place and a comprehensive explanation[1]. |
|---|---|---|---|
| **1k (not mandatory)** | (k) Where practicable, sectoral benchmarking on a regular basis, including energy efficiency and energy conservation activities, choice of input materials, emissions to air, discharges to water, consumption of water and generation of waste. | Yes | In Place |
| **2** | Ensure the provision of full details of the activities carried out on-site. A good detail of that is contained in the following documentation (see Section 4.1.2.7 and related to BAT number 1.g) | Yes | In Place |
| **2a** | a. descriptions of the waste treatment methods and procedures in place in the installation | Yes | In Place |
| **2b** | b. diagrams of the main plant items where they have some environmental relevance, together with process flow diagrams (schematics) | Yes | In Place |

| BAT No. | BAT Description | Applicability Assessment<br>State "applicable" if the technique applies to your installation.<br>State "No" if not, and provide a comprehensive explanation[1]. | Status of technique at installation<br>If applicable, state "in place" if the technique is in place at your installation.<br>If not, state "not in place", the date it will be in place and a comprehensive explanation[1]. |
|---|---|---|---|
| **2c** | c. details of the chemical reactions and their reaction kinetics/energy balance | No | |
| **2d** | d. details on the control system philosophy and how the control system incorporates the environmental monitoring information | Yes | In Place |
| **2e** | e. details on how protection is provided during abnormal operating conditions such as momentary stoppages, start-ups, and shutdowns | Yes | In Place |
| **2f** | f. an instruction manual | Yes | In Place |
| **2g** | g. an operational diary (related to BAT number 3) | Yes | In Place |

| BAT No. | BAT Description | Applicability Assessment<br>State "applicable" if the technique applies to your installation.<br>State "No" if not, and provide a comprehensive explanation[1]. | Status of technique at installation<br>If applicable, state "in place" if the technique is in place at your installation.<br>If not, state "not in place", the date it will be in place and a comprehensive explanation[1]. |
|---|---|---|---|
| **2h** | h. an annual survey of the activities carried out and the waste treated. The annual survey should also contain a quarterly balance sheet of the waste and residue streams, including the auxiliary materials used for each site (related to BAT number 1.g). | Yes | In Place |
| **3** | Have a good housekeeping procedure in place, which will also cover the maintenance procedure, and an adequate training programme, covering the preventive actions that workers need to take on health and safety issues and environmental risks (see Sections 4.1.1.4, 4.1.1.5, 4.1.2.5, 4.1.2.10, 4.1.4.8 and 4.1.4.3) | Yes | In Place |
| **4** | Try to have a close relationship with the waste producer/holder in order that the customers sites implement measures to produce the required quality of waste necessary for the waste treatment process to be carried out (see Section 4.1.2.9) | Yes | In Place |
| **5** | Have sufficient staff available and on duty with the requisite qualifications at all times. All personnel should undergo specific job training and further education (see Section 4.1.2.10. This is also related to BAT number 3) | Yes | In Place |
| | **Waste IN** | | |

| BAT No. | BAT Description | Applicability Assessment<br>State "applicable" if the technique applies to your installation.<br>State "No" if not, and provide a comprehensive explanation[1]. | Status of technique at installation<br>If applicable, state "in place" if the technique is in place at your installation.<br>If not, state "not in place", the date it will be in place and a comprehensive explanation[1]. |
|---|---|---|---|
| | To improve the knowledge of the waste IN, BAT is to: | | |
| **6** | Have a concrete knowledge of the waste IN. Such knowledge needs to take into account the waste OUT, the treatment to be carried out, the type of waste, the origin of the waste, the procedure under consideration (see BAT number 7 and 8) and the risk (related to waste OUT and the treatment) (see Section 4.1.1.1). Guidance on some of these issues is provided in Sections 4.2.3, 4.3.2.2 and 4.4.1.2. | Yes | In Place |
| **7** | Implement pre-acceptance procedure containing at least the following items (see Section 4.1.1.2): | | |
| **7a** | a. tests for the incoming waste with respect to the planned treatment | Yes | In Place |
| **7b** | b. making sure that all necessary information is received on the nature of the process(es) producing the waste, including the variability of the process. The personnel having to deal with the pre-acceptance procedure need to be able due to his profession and/or experience to deal with all necessary questions relevant for the | Yes | In Place |

| BAT No. | BAT Description | Applicability Assessment<br>State "applicable" if the technique applies to your installation.<br>State "No" if not, and provide a comprehensive explanation[1]. | Status of technique at installation<br>If applicable, state "in place" if the technique is in place at your installation.<br>If not, state "not in place", the date it will be in place and a comprehensive explanation[1]. |
|---|---|---|---|
| | treatment of the wastes in the WT facility | | |
| **7c** | c. a system for providing and analysing a representative sample(s) of the waste from the production process producing such waste from the current holder | Yes | In Place |
| **7d** | d. a system for carefully verifying, if not dealing directly with the waste producer, the information received at the pre-acceptance stage, including the contact details for the waste producer and an appropriate description of the waste regarding its composition and hazardousness | Yes | In Place |
| **7e** | e. making sure that the waste code according to the European Waste List (EWL) is provided | Yes | In Place |

| BAT No. | BAT Description | Applicability Assessment<br>State "applicable" if the technique applies to your installation.<br>State "No" if not, and provide a comprehensive explanation[1]. | Status of technique at installation<br>If applicable, state "in place" if the technique is in place at your installation.<br>If not, state "not in place", the date it will be in place and a comprehensive explanation[1]. |
|---|---|---|---|
| **7f** | f. identifying the appropriate treatment for each waste to be received at the installation (see Section 4.1.2.1) by identifying a suitable treatment method for each new waste enquiry and having a clear methodology in place to assess the treatment of waste, that considers the physico-chemical properties of the individual waste and the specifications for the treated waste. | Yes | In Place |
| **8** | Implement an acceptance procedure containing at least the following items (see Section 4.1.1.3): | | |
| **8a** | a. a clear and specified system allowing the operator to accept wastes at the receiving plant only if a defined treatment method and disposal/recovery route for the output of the treatment is determined (see pre-acceptance in BAT number 7). Regarding the planning for the acceptance, it needs to be guaranteed that the necessary storage (see Section 4.1.4.1), treatment capacity and dispatch conditions (e.g. acceptance criteria of the output by the other installation) are also respected. | Yes | In Place |
| **8b** | b. measures in place to fully document and deal with acceptable wastes arriving at the site, such as a pre-booking system, to ensure e.g. that sufficient capacity is available | Yes | In Place |

| BAT No. | BAT Description | Applicability Assessment<br>State "applicable" if the technique applies to your installation.<br>State "No" if not, and provide a comprehensive explanation[1]. | Status of technique at installation<br>If applicable, state "in place" if the technique is in place at your installation.<br>If not, state "not in place", the date it will be in place and a comprehensive explanation[1]. |
|---|---|---|---|
| **8c** | c. clear and unambiguous criteria for the rejection of wastes and the reporting of all non-conformances | Yes | In Place |
| **8d** | d. a system for identifying the maximum capacity limit of waste that can be stored at the facility (related to BAT number 10.b, 10.c, 27 and 24.f) | Yes | In Place |
| **8e** | e. visually inspect the waste IN to check compliance with the description received during the pre-acceptance procedure. *For some liquid and hazardous waste, this BAT is No* (see Section 4.1.1.3). | Yes | In Place |
| **9** | **Implement different sampling procedures for all different incoming waste vessels delivered in bulk and/or containers. These sample procedures may contain the following items (see Section 4.1.1.4):** | | |
| **9a** | a. sampling procedures based on a risk approach. Some elements to consider are the type of waste (e.g. *hazardous* or non-hazardous) and the knowledge of the customer (e.g. waste producer) | Yes | In Place |

| BAT No. | BAT Description | Applicability Assessment<br>State "applicable" if the technique applies to your installation.<br>State "No" if not, and provide a comprehensive explanation[1]. | Status of technique at installation<br>If applicable, state "in place" if the technique is in place at your installation.<br>If not, state "not in place", the date it will be in place and a comprehensive explanation[1]. |
|---|---|---|---|
| **9b** | b. check on the relevant physico-chemical parameters. The relevant parameters are related to the knowledge of the waste needed in each case (see BAT number 6) | Yes | In Place |
| **9c** | c. registration of all waste materials | Yes | In Place |
| **9d** | d. have different sampling procedures for bulk (liquid and solids), large and small containers and laboratory smalls. The number of samples taken should increase with the number of containers. In extreme situations, small containers must all be checked against the accompanying paperwork. The procedure should contain a system for recording the number of samples and degree of consolidation | Yes | In Place |
| **9e** | e. details of the sampling of wastes in drums within designated storage, e.g. the timescale after receipt | Yes | In Place |
| **9f** | f. sample prior to acceptance | Yes | In Place |

| BAT No. | BAT Description | Applicability Assessment<br>State "applicable" if the technique applies to your installation.<br>State "No" if not, and provide a comprehensive explanation[1]. | Status of technique at installation<br>If applicable, state "in place" if the technique is in place at your installation.<br>If not, state "not in place", the date it will be in place and a comprehensive explanation[1]. |
|---|---|---|---|
| **9g** | g. maintenance of a record at the installation of the sampling regime for each load, together with a record of the justification for the selection of each option | Yes | In Place |
| **9h** | h. a system for determining and recording:<br>• a suitable location for the sampling points<br>• the capacity of the vessel sampled (for samples from drums, an additional parameter would be the total number of drums)<br>• the number of samples and degree of consolidation<br>• the operating conditions at the time of sampling. | Yes | In Place |
| **9i** | i. a system to ensure that the waste samples are analysed (see Section 4.1.1.5) | Yes | In Place |
| **9j** | j. in the case of cold ambient temperatures, a temporary storage may be needed in order to allow sampling after defrosting. This may affect the applicability of some of the above items in this BAT (see Section 4.1.1.5). | Yes | In Place |
| **10** | Have a reception facility covering at least the following issues (see Section 4.1.1.5): | | |

| BAT No. | BAT Description | Applicability Assessment<br>State "applicable" if the technique applies to your installation.<br>State "No" if not, and provide a comprehensive explanation[1]. | Status of technique at installation<br>If applicable, state "in place" if the technique is in place at your installation.<br>If not, state "not in place", the date it will be in place and a comprehensive explanation[1]. |
|---|---|---|---|
| **10a** | a. have a laboratory to analyse all the samples at the speed required by BAT. Typically this requires having a robust quality assurance system, quality control methods and maintaining suitable records for storing the analyses results. *Particularly for hazardous wastes, this often means that the laboratory needs to be on-site* | No | |
| **10b** | b. have a dedicated quarantine waste storage area as well as written procedures to manage non-accepted waste. If the inspection or analysis indicates that the wastes fail to meet the acceptance criteria (including, e.g. damaged, corroded or unlabelled drums) then the wastes can be temporarily stored there safely. Such storage and procedures should be designed and managed to promote the rapid management (typically a matter of days or less) to find a solution for that waste | Yes | In Place |
| **10c** | c. have a clear procedure dealing with wastes where inspection and/or analysis prove that they do not fulfil the acceptance criteria of the plant or do not fit with the waste description received during the pre-acceptance procedure. The procedure should include all measures as required by the permit or national/international legislation to inform competent authorities, to safely store the delivery for any transition period or to reject the waste and send it back to the waste producer or to any other authorised destination | Yes | In Place |
| **10d** | d. move waste to the storage area only after acceptance of the waste (related to BAT number 8) | Yes | In Place |

| BAT No. | BAT Description | Applicability Assessment<br>State "applicable" if the technique applies to your installation.<br>State "No" if not, and provide a comprehensive explanation[1]. | Status of technique at installation<br>If applicable, state "in place" if the technique is in place at your installation.<br>If not, state "not in place", the date it will be in place and a comprehensive explanation[1]. |
|---|---|---|---|
| **10e** | e. mark the inspection, unloading and sampling areas on a site plan | Yes | In Place |
| **10f** | f. have a sealed drainage system (related to BAT number 63) | Yes | In Place |
| **10g** | g. a system to ensure that the installation personnel who are involved in the sampling, checking and analysis procedures are suitably qualified and adequately trained, and that the training is updated on a regular basis (related to BAT number 5) | Yes | In Place |
| **10h** | h. the application of a waste tracking system unique identifier (label/code) to each container at this stage. The identifier will contain at least the date of arrival on-site and the waste code (related to BAT number 9 and 12). | Yes | In Place |
| | **Waste OUT** | | |

| BAT No. | BAT Description | Applicability Assessment<br>State "applicable" if the technique applies to your installation.<br>State "No" if not, and provide a comprehensive explanation[1]. | Status of technique at installation<br>If applicable, state "in place" if the technique is in place at your installation.<br>If not, state "not in place", the date it will be in place and a comprehensive explanation[1]. |
|---|---|---|---|
| **11** | To improve the knowledge of the waste OUT, BAT is to analyse the waste OUT according to the relevant parameters important for the receiving facility (e.g. landfill, incinerator) (see Section 4.1.1.1). | Yes | In Place |
| | **Management systems** | [redacted] | |
| | BAT is to: | | |
| **12** | Have a system in place to guarantee the traceability of waste treatment. Different procedures may be needed to take into account the physico-chemical properties of the waste (e.g. liquid, solid), type of WT process (e.g. continuous, batch) as well as the changes that may occur to the physico-chemical properties of the wastes when the WT is carried out. A good traceability system contains the following items (see Section 4.1.2.3): | Yes | In Place |
| **12a** | a. documenting the treatments by flow charts and mass balances (see Section 4.1.2.4 and this is also related to BAT number 2.a) | Yes | In Place |

| BAT No. | BAT Description | Applicability Assessment<br>State "applicable" if the technique applies to your installation.<br>State "No" if not, and provide a comprehensive explanation[1]. | Status of technique at installation<br>If applicable, state "in place" if the technique is in place at your installation.<br>If not, state "not in place", the date it will be in place and a comprehensive explanation[1]. |
|---|---|---|---|
| **12b** | b. carrying out data traceability through several operational steps (e.g. pre-acceptance/acceptance/storage/treatment/dispatch). Records can be made and kept up-to-date on an ongoing basis to reflect deliveries, on-site treatment and dispatches. Records are typically held for a minimum of six months after the waste has been dispatched | Yes | In Place |
| **12c** | c. recording and referencing the information on waste characteristics and the source of the waste stream, so that it is available at all times. A reference number needs to be given to the waste and needs to be obtainable at any time in the process to enable the operator to identify where a specific waste is in the installation, the length of time it has been there and the proposed or actual treatment route | Yes | In Place |
| **12d** | d. having a computer database/series of databases, which are regularly backed up. The tracking system operates as a waste inventory/stock control system and includes:<br>• date of arrival on-site,<br>• waste producer details,<br>• details on all previous holders,<br>• an unique identifier,<br>• pre-acceptance and acceptance analysis results,<br>• package type and size,<br>• intended treatment/disposal route,<br>• an accurate record of the nature and quantity of wastes held on-site including all hazards details on where the waste is physically located in relation to a site plan,<br>• at which point in the designated disposal route the waste is currently positioned | Yes | In Place |

| BAT No. | BAT Description | Applicability Assessment<br>State "applicable" if the technique applies to your installation.<br>State "No" if not, and provide a comprehensive explanation[1]. | Status of technique at installation<br>If applicable, state "in place" if the technique is in place at your installation.<br>If not, state "not in place", the date it will be in place and a comprehensive explanation[1]. |
|---|---|---|---|
| **12e** | e. only moving drums and other mobile containers between different locations (or loaded for removal off site) under instructions from the appropriate manager, ensuring that the waste tracking system is amended to record these changes (see Section 4.1.4.8). | Yes | In Place |
| **13** | Have and apply mixing/blending rules oriented to restrict the types of wastes that can be mixed/blended together in order to avoid increasing pollution emission of down-stream waste treatments. These rules need to consider the type of waste (e.g. *hazardous,* non-hazardous), waste treatment to be applied as well as the following steps that will be carried out to the waste OUT (see Section 4.1.5) | Yes | In Place |
| **14** | Have a segregation and compatibility procedure in place (see Section 4.1.5 and this is also related to BAT number 13 and 24.c), including: | Yes | In Place |
| **14a** | a. keeping records of the testing, including any reaction giving rise to safety parameters (increase in temperature, generation of gases or raising of pressure); a record of the operating parameters (viscosity change and separation or precipitation of solids) and any other relevant parameters, such as generation of odours (see Sections 4.1.4.13 and 4.1.4.14) | Yes | In Place |
| **14b** | b. packing containers of chemicals into separate drums based on their hazard classification. Chemicals which are incompatible (e.g. oxidisers and flammable liquids) should not be stored in the same drum (see Section 4.1.4.6). | Yes | In Place |

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|---|---|---|---|
| **15** | Have an approach for improving waste treatment efficiency. This typically includes the finding of suitable indicators to report WT efficiency and a monitoring programme (see Section 4.1.2.4 and this is also related to BAT number 1) | Yes | In Place |
| **16** | Produce a structured accident management plan (see Section 4.1.7) | Yes | In Place |
| **17** | Have and properly use an incident diary (see Section 4.1.7 and related to BAT number 1 and to quality management system) | Yes | In Place |
| **18** | Have a noise and vibration management plant in place as part of the EMS (see Section 4.1.8 and this is also related to BAT number 1). For some WT installations, noise and vibration may not be an environmental problem | Yes | In Place |
| **19** | Consider any future decommissioning at the design stage. For existing installations and where decommissioning problems are identified, put a programme to minimise these problems in place (see Section 4.1.9 and this is also related to BAT number 1.i). | Yes | In Place |

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|---|---|---|---|
| | **Utilities and raw material management**<br>BAT is to: | | |
| **20** | The type of source (i.e. electricity, gas, liquid conventional fuels, solid conventional fuels and waste) (see Section 4.1.3.1 and related to BAT number 1.k). This involves: | Yes | In Place |
| **20a** | a. reporting the energy consumption information in terms of delivered energy | Yes | In Place |
| **20b** | b. reporting the energy exported from the installation | No | |
| **20c** | c. providing energy flow information (for example, diagrams or energy balances) showing how the energy is used throughout the process. | | |

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|---|---|---|---|
| **21** | Continuously increase the energy efficiency of the installation, by (see Section 4.1.3.4): | Yes | In Place |
| **21a** | a. Developing an energy efficiency plan. | | |
| **21b** | b. using techniques that reduce energy consumption and thereby reduce both direct (heat and emissions from on-site generation) and indirect (emissions from a remote power station) emissions | | |
| **21c** | c. defining and calculating the specific energy consumption of the activity (or activities), setting key performance indicators on an annual basis (e.g. MWh/tonne of waste processed) (related to BAT number 1.k and 20). | | |
| **22** | Carry out internal bench marking (e.g. on an annual basis) of raw materials consumption (related to BAT number 1.k). Some applicability limitations have been identified and these are mentioned in Section 4.1.3.5. | Yes | In Place |

| BAT No. | BAT Description | Applicability Assessment<br>State "applicable" if the technique applies to your installation.<br>State "No" if not, and provide a comprehensive explanation[1]. | Status of technique at installation<br>If applicable, state "in place" if the technique is in place at your installation.<br>If not, state "not in place", the date it will be in place and a comprehensive explanation[1]. |
|---|---|---|---|
| **23** | Explore the options for the use of waste as a raw material for the treatment of other wastes (see Section 4.1.3.5). If waste is used to treat other wastes, then to have a system in place to guarantee that the waste supply is available. If this cannot be guaranteed, a secondary treatment or other raw materials should be in place in order to avoid any unnecessary waiting treatment time (see Section 4.1.2.2) | No | |
| | **Storage and handling**<br>BAT is to: | | |
| **24** | apply the following techniques related to storage (see Section 4.1.4.1): | | |
| **24a** | a. locating storage areas:<br>• away from watercourses and sensitive perimeters, and<br>• in such a way so as to eliminate or minimise the double handling of wastes within the installation | Yes | In Place |
| **24b** | b. ensuring that the storage area drainage infrastructure can contain all possible contaminated run-off and that drainage from incompatible wastes cannot come into contact with each other | Yes | In Place |

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|---|---|---|---|
| **24c** | c. using a dedicated area/store which is equipped with all necessary measures related to the specific risk of the wastes for sorting and repackaging laboratory smalls or similar waste. These wastes are sorted according to their hazard classification, with due consideration for any potential incompatibility problems and then repackaged. After that, they are removed to the appropriate storage area | Yes | In Place |
| **24d** | d. handling odorous materials in fully enclosed or suitably abated vessels and storing them in enclosed buildings connected to abatement | No | |
| **24e** | e. ensuring that all connections between the vessels are capable of being closed via valves. Overflow pipes need to be directed to a contained drainage system (i.e. the relevant bunded area or another vessel) | Yes | In Place |
| **24f** | f. having measures available to prevent the building up of sludges higher than a certain level and the emergence of foams that may affect such measures in liquid tanks, e.g. by regularly controlling the tanks, sucking out the sludges for appropriate further treatment and using anti-foaming agents | No | |
| **24g** | g. equipping tanks and vessels with suitable abatement systems when volatile emissions may be generated, together with level meters and alarms. These systems need to be sufficiently robust (able to work if sludge and foam is present) and regularly maintained | No | |

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|---|---|---|---|
| **24h** | h. storing organic waste liquid with a low flashpoint under a nitrogen atmosphere to keep it inertised. Each storage tank is put in a waterproof retention area. Gas effluents are collected and treated | No | Not In Place |
| **25** | Separately bund the liquid decanting and storage areas using bunds which are impermeable and resistant to the stored materials (see Section 4.1.4.4) | Yes | In Place |
| **26** | Apply the following techniques concerning tank and process pipework labelling (see Section 4.1.4.12): | | |
| **26a** | a. clearly labelling all vessels with regard to their contents and capacity, and applying an unique identifier. Tanks need to have an appropriately labelled system depending on their use and contents | Yes | In Place |
| **26b** | b. ensuring that the label differentiates between waste water and process water, combustible liquid and combustible vapour and the direction of flow (i.e. in or outflow) | Yes | In Place |

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|---|---|---|---|
| **26c** | c. keeping records for all tanks,<br>• detailing the unique identifier;<br>• capacity;<br>• its construction, including materials;<br>• maintenance schedules and inspection results;<br>• fittings; and<br>• the waste types which may be stored/treated in the vessel, including flashpoint limits | Yes | In Place |
| **27** | Take measures to avoid problems that may be generated from the storage/accumulation of waste. This may conflict with BAT number 23 when waste is used as a reactant (see Section 4.1.4.10). | Yes | In Place |
| **28** | apply the following techniques when handling waste (see Section 4.1.4.6): | | |
| **28a** | a. having systems and procedures in place to ensure that wastes are transferred to the appropriate storage safely | Yes | In Place |

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|---|---|---|---|
| **28b** | b. having in place a management system for the loading and unloading of waste in the installation, which also takes into consideration any risks that these activities may incur. Some options for this include ticketing systems, supervision by site staff, keys or colour-coded points/hoses or fittings of a specific size | Yes | In Place |
| **28c** | c. ensuring that a qualified person attends the waste holder site to check the laboratory smalls, the old original waste, waste from an unclear origin or undefined waste (especially if drummed), to classify the substances accordingly and to package into specific containers. In some cases, the individual packages may need to be protected from mechanical damage in the drum with fillers adapted to the packaged waste properties | Yes | In Place |
| **28d** | d. ensuring that damaged hoses, valves and connections are not used | Yes | In Place |
| **28e** | e. collecting the exhaust gas from vessels and tanks when handling liquid waste | No | Not In Place |

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|---|---|---|---|
| **28f** | f. unloading solids and sludge in closed areas which are fitted with extractive vent systems linked to abatement equipment when the handled waste can potentially generate emission to air (e.g. odours, dust, VOCs) (see Section 4.1.4.7) | No | Not In Place |
| **28g** | g. using a system to ensure the bulking of different batches only takes place with compatibility testing (see Section 4.1.4.7 and 4.1.5 and this is also related to BAT number 13, 14 and 30). | No | Not In Place |
| **29** | Ensure that the bulking/mixing to or from packaged waste only takes place under instruction and supervision and is carried out by trained personnel. For certain types of wastes, such a bulking/mixing needs to be carried out under local exhaust ventilation (see Section 4.1.4.8) | Yes | In Place |
| **30** | Ensure that chemical incompatibilities guide the segregation required during storage (see Section 4.1.4.13 and 4.1.4.14 and this is also related to BAT number 14) | Yes | In Place |
| **31** | Apply the following techniques when containerised wastes are handled (see Section 4.1.4.2): | | |

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|---|---|---|---|
| **31a** | a. storing of containerised wastes under cover. This can also be applied to any container that is held in storage pending sampling and emptying. Some exceptions on the applicability of this technique related to containers or waste not affected by ambient conditions (e.g. sunlight, temperature, water) have been identified (see Section 4.1.4.2). Covered areas need to have adequate provision for ventilation | Yes | In Place |
| **31b** | b. maintaining the availability and access to storage areas for containers holding substances that are known to be sensitive to heat, light and water, under cover and protected from heat and direct sunlight. | | |
| | **Other common techniques not mentioned above**<br>BAT is to: | | |
| **32** | Perform crushing, shredding and sieving operations in areas fitted with extractive ventilation systems linked to abatement equipment (see Section 4.1.6.1) when handling materials that can generate emission to air (e.g. odours, dust, VOCs). | No | |
| **33** | Perform crushing/shredding operations (see Sections 4.1.6.1 and 4.6) under full encapsulation and under an inert atmosphere for drums/containers containing flammable or highly volatile substances. This will avoid ignition. The inert atmosphere is to be abated. | No | |

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|---|---|---|---|
| **33** | Perform washing processes considering: | | |
| **33a** | (a) Identifying the washed components that may be present in the items to be washed (e.g. solvents). | No | |
| **34b** | (b) Transferring washings to appropriate storage and then treating them in the same way as the waste from which they were derived. | No | |
| **34c** | (c) Using treated waste water from the WT plant for washing instead of fresh water. The resultant waste water can then be treated in the WWTP or re-used in the installation. | No | |
| | **Air emission treatments**<br>To prevent or control the emissions mainly of dust, odours and VOC and some inorganic compounds, BAT is to: | | |

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|---|---|---|---|
| **35** | Restrict the use of open topped tanks, vessels and pits by: | | |
| **35a** | (a) not allowing direct venting or discharges to air by linking all the vents to suitable abatement systems when storing materials that can generate emissions to the air (e.g. odours, dust, VOCs) (see Section 4.1.4.5). | Yes | Will be part of the APCR bagging plant |
| **35b** | (b) keeping the waste or raw materials under cover or in waterproof packaging (see Section 4.1.4.5 and this is also related to BAT number 31 a) | Yes | In Place |
| **35c** | (c) connecting the head space above the settlement tanks (e.g. where oil treatment is a pre-treatment process within a chemical treatment plant) to the overall site exhaust and scrubber units (see Section 4.1.4.1). | No | |
| **36** | Use an enclosed system with extraction, or under depression, to a suitable abatement plant. This technique is especially relevant to processes which involve the transfer of volatile liquids, including during tanker charging/discharging (see Section 4.6.1). | Yes | Will be part of APCR bagging plant |

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|---|---|---|---|
| **37** | Apply a suitably sized extraction system which can cover the holding tanks, pre-treatment areas, storage tanks, mixing/reaction tanks and the filter press areas, or to have in place a separate system to treat the vent gases from specific tanks (for example, activated carbon filters from tanks holding waste contaminated with solvents) (see Section 4.6.1). | Applicable | Will be part of APCR bagging plant |
| **38** | Correctly operate and maintain the abatement equipment, including the handling and treatment/disposal of spent scrubber media (see Section 4.6.11). | Applicable | Will be part of APCR bagging plant |
| **39** | Have a scrubber system in place for the major inorganic gaseous releases from those unit operations which have a point discharge from process emissions. Install a secondary scrubber unit to certain pre-treatment systems if the discharge is incompatible, or too concentrated for the main scrubbers (see Section 4.6.11). | No | Not in Place |
| **40** | Have leak detection and repair procedures in place in installations a) handling a large number of piping components and storage and b) compounds that may leak easily and create an environmental problem (e.g. fugitive emissions, soil contamination) (see Section 4.6.2). This may be seen as an element of the EMS (see BAT number 1) | Yes | In Place |
| **41** | Reduce air emissions to the following levels by using a suitable combination of preventive and/or abatement techniques (see Section 4.6). The techniques mentioned above in the BAT 'Air emission treatments' section (BAT numbers 35-41) also contribute to achieve these values. | *Refer to the EPA BAT Guidance Note for BAT associated emission levels* | In Place |

| BAT No. | BAT Description | Applicability Assessment<br>State "applicable" if the technique applies to your installation.<br>State "No" if not, and provide a comprehensive explanation[1]. | Status of technique at installation<br>If applicable, state "in place" if the technique is in place at your installation.<br>If not, state "not in place", the date it will be in place and a comprehensive explanation[1]. |
|---|---|---|---|
| | | | |
| | **Waste water management**<br>BAT is to: | | |
| **42** | Reduce the water use and the contamination of water by (see Sections 4.1.3.6 and 4.7.1): | | |
| **42a** | (a) applying site waterproofing and storage retention methods. | Yes | In Place |
| **42b** | (b) carrying out regular checks of the tanks and pits especially when they are underground | No | |

| BAT No. | BAT Description | Applicability Assessment<br>State "applicable" if the technique applies to your installation.<br>State "No" if not, and provide a comprehensive explanation[1]. | Status of technique at installation<br>If applicable, state "in place" if the technique is in place at your installation.<br>If not, state "not in place", the date it will be in place and a comprehensive explanation[1]. |
|---|---|---|---|
| **42c** | (c) applying separated water drainage according to the pollution load (roof water, road water, process water). | Yes | In Place |
| **42d** | (d) applying a security collection basin. | Yes | In Place |
| **42e** | (e) Performing regular water audits, with the aim of reducing water consumption and preventing water contamination. | Yes | In Place |
| **42f** | (f) segregating process water from rain water (see Section 4.7.2 and this is also related to BAT number 46) | Yes | In Place |
| **43** | Have procedures in place to ensure that the effluent specification is suitable for the on-site effluent treatment system or discharge (see Section 4.7.1). | Yes | In Place |

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|---|---|---|---|
| **44** | Avoid the effluent by-passing the treatment plant systems (see Section 4.7.1). | No | |
| **45** | Have in place and operate an enclosure system whereby rainwater falling on the processing areas is collected along with tanker washings, occasional spillages, drum washings, etc. and returned to the processing plant or collected in a combined interceptor (see Section 4.7.1). | Yes | In Place |
| **46** | Segregate the water collecting systems for potentially more contaminated waters from less contaminated water (see Section 4.7.2). | Yes | In Place |
| **47** | Have a full concrete base in the whole treatment area, that falls to internal site drainage systems which lead to storage tanks or to interceptors that can collect rainwater and any spillage. Interceptors with an overflow to sewer usually need automatic monitoring systems, such as pH checks, which can shut down the overflow (see Section 4.1.3.6 and this is also related to BAT number 63). | Yes | In Place |
| **48** | Collect the rainwater in a special basin for checking, treatment if contaminated and further use (see Section 4.7.1) | Yes | In Place |

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|---|---|---|---|
| **49** | Maximise the re-use of treated waste waters and use of rainwater in the installation (see Section 4.7.1). | No | |
| **50** | Conduct daily checks on the effluent management system and to maintain a log of all checks carried out, by having a system for monitoring the effluent discharge and sludge quality in place (see Section 4.7.1) | No | |
| **51** | Firstly identify waste waters that may contain<br>• hazardous compounds (e.g. adsorbable organically bound halogens (AOX);<br>• cyanides;<br>• sulphides;<br>• aromatic compounds;<br>• benzene or hydrocarbons (dissolved, emulsified or undissolved); and<br>• metals, such as mercury, cadmium, lead, copper, nickel, chromium, arsenic and zinc) (see Section 4.7.2).<br><br>Secondly, segregate the previously identified waste water streams on-site and thirdly, specifically treat waste water on-site or off-site. | No | |
| **52** | Ultimately after the application of BAT number 42, select and carry out the appropriate treatment technique for each type of waste water (see Section 4.7.1) | No | |

<table>
<tr><th>BAT No.</th><th>BAT Description</th><th>Applicability Assessment<br>State "applicable" if the technique applies to your installation.<br>State "No" if not, and provide a comprehensive explanation[1].</th><th>Status of technique at installation<br>If applicable, state "in place" if the technique is in place at your installation.<br>If not, state "not in place", the date it will be in place and a comprehensive explanation[1].</th></tr>
<tr><td>53</td><td>Implement measures to increase the reliability with which the required control and abatement performance can be carried out (for example, optimising the precipitation of metals) (see Section 4.7.1)</td><td>No</td><td></td></tr>
<tr><td>54</td><td>Identify the main chemical constituents of the treated effluent (including the make-up of the COD) and to then make an informed assessment of the fate of these chemicals in the environment (see Section 4.7.1 and their applicability restrictions identified)</td><td>No</td><td></td></tr>
<tr><td>55</td><td>Only discharge the waste water from its storage after the conclusion of all the treatment measures and a subsequent final inspection (see Section 4.7.1)</td><td>No</td><td></td></tr>
<tr><td>56</td><td>Achieve the following emissions level values before discharge by applying a suitable combination of techniques mentioned in Sections 4.4.2.3 and 4.7. The techniques mentioned above in this section on 'waste water management' (BAT number 42 – 55) also contribute to reach these values.
<table>
<tr><th>Water parameter</th><th>Emission values associated with the use of BAT (ppm)</th></tr>
<tr><td>COD</td><td>20 – 120</td></tr>
<tr><td>BOD</td><td>2 – 20</td></tr>
<tr><td>Heavy metals (Cr, Cu, Ni, Pb, Zn)</td><td>0.1 – 1</td></tr>
</table></td><td>No</td><td></td></tr>
</table>

| BAT No. | BAT Description | Applicability Assessment<br>State "applicable" if the technique applies to your installation.<br>State "No" if not, and provide a comprehensive explanation[1]. | Status of technique at installation<br>If applicable, state "in place" if the technique is in place at your installation.<br>If not, state "not in place", the date it will be in place and a comprehensive explanation[1]. |
|---|---|---|---|
| | Highly toxic heavy metals:<br>As <0.1<br>Hg 0.01 – 0.05<br>Cd <0.1 – 0.2<br>Cr(VI) <0.1 – 0.4 | | |
| | **Management of the process generated residues**<br>BAT is to: | | |
| **57** | Have a residue management plan (see Section 4.8.1) as part of the EMS including: | Yes | In Place |
| **57a** | (a) Basic housekeeping techniques (related to BAT number 3). | Yes | In Place |
| **57b** | (b) Internal bench marking techniques (see Section 4.1.2.8 and this is also related to BAT numbers 1.k and 22). | Yes | In Place |

| BAT No. | BAT Description | Applicability Assessment<br>State "applicable" if the technique applies to your installation.<br>State "No" if not, and provide a comprehensive explanation[1]. | Status of technique at installation<br>If applicable, state "in place" if the technique is in place at your installation.<br>If not, state "not in place", the date it will be in place and a comprehensive explanation[1]. |
|---|---|---|---|
| **58** | Maximise the use of re-usable of packaging (drums, containers, IBCs, pallets etc.) (see Section 4.8.1) | Yes | In Place |
| **59** | Re-use drums when they are in good working state. In other cases, they are to be sent for appropriate treatment (see Section 4.8.1). | Yes | In Place |
| **60** | Keep a monitoring inventory of the waste on-site by using records of the amount of wastes received on-site and records of the wastes processed (see Section 4.8.3 and this is also related to BAT number 27) | Yes | In Place |
| **61** | Re-use the waste from one activity/treatment possibly as a feedstock for another (see Section 4.1.2.6 and this is also related to BAT number 23). | No | Not In Place |
| | **Soil contamination**<br>To prevent soil contamination, BAT is to: | | |

| BAT No. | BAT Description | Applicability Assessment<br>State "applicable" if the technique applies to your installation.<br>State "No" if not, and provide a comprehensive explanation[1]. | Status of technique at installation<br>If applicable, state "in place" if the technique is in place at your installation.<br>If not, state "not in place", the date it will be in place and a comprehensive explanation[1]. |
|---|---|---|---|
| **62** | Provide and then maintain the surfaces of operational areas, including applying measures to prevent or quickly clear away leaks and spillages, and ensuring that maintenance of drainage systems and other subsurface structures is carried out (see Section 4.8.2) | Yes | In Place |
| **63** | Utilise an impermeable base and internal site drainage (see Section 4.1.4.6, 4.7.1 and 4.8.2) | Yes | In Place |
| **64** | Reduce the installation site and minimise the use of underground vessels and pipework (see Section 4.8.2 and this is also related to BAT number 10.f, 25, and 40) | Yes | In Place |
| | **5.2 BAT for specific types of waste treatments**<br><br>This section presents the BAT elements for each process/activity covered in this document. It has been structured in a similar way as previous chapters. | | |
| | **Biological treatments**<br>BAT is to: | | |

| BAT No. | BAT Description | Applicability Assessment<br>State "applicable" if the technique applies to your installation.<br>State "No" if not, and provide a comprehensive explanation[1]. | Status of technique at installation<br>If applicable, state "in place" if the technique is in place at your installation.<br>If not, state "not in place", the date it will be in place and a comprehensive explanation[1]. |
|---|---|---|---|
| **65** | Use the following techniques for storage and handling in biological systems (see Section 4.2.2): | | |
| **65a** | (a) for less odour-intensive wastes, use automated and rapid action doors (opening times of the doors being kept to a minimum) in combination with an appropriate exhaust air collection device resulting in an under pressure in the hall. | No | |
| **65b** | (b) for highly odour-intensive wastes, use closed feed bunkers constructed with a vehicle sluice. | No | |
| **65c** | (c) house and equip the bunker area with an exhaust air collection device. | No | |
| **66** | Adjust the admissible waste types and separation processes according to the type of process carried out and the abatement technique applicable (e.g. depending on the content of non-biodegradable components) (see Section 4.2.3). | No | |

| BAT No. | BAT Description | Applicability Assessment<br>State "applicable" if the technique applies to your installation.<br>State "No" if not, and provide a comprehensive explanation[1]. | Status of technique at installation<br>If applicable, state "in place" if the technique is in place at your installation.<br>If not, state "not in place", the date it will be in place and a comprehensive explanation[1]. |
|---|---|---|---|
| **67** | Use the following techniques when applying anaerobic digestion (see Sections 4.2.4 and 4.2.5): | | |
| **67a** | (a) application of a close integration between the process with the water management. | No | |
| **67b** | (b) a recycling of the maximum amount of waste water to the reactor. See some operational issues that may appear when applying this technique in Section 4.2.4. | No | |
| **67c** | (c) operate the system under thermophilic digestion conditions. For certain types of wastes, thermophilic conditions cannot to be reached (see Section 4.2.4). | No | |
| **67d** | (d) measure TOC, COD, N, P and Cl levels in the inlet and outlet flows. When a better control of the process is required, or a better quality of the waste OUT, more parameters are necessary for measuring and controlling. | No | |

| BAT No. | BAT Description | Applicability Assessment<br>State "applicable" if the technique applies to your installation.<br>State "No" if not, and provide a comprehensive explanation[1]. | Status of technique at installation<br>If applicable, state "in place" if the technique is in place at your installation.<br>If not, state "not in place", the date it will be in place and a comprehensive explanation[1]. |
|---|---|---|---|
| **67e** | (e) maximise the production of biogas. This technique needs to consider the effect on the digestate and biogas quality. | No | |
| **68** | Reduce the air emissions of the exhaust gas when using biogas as a fuel by restricting the emissions of dust, NOx, SOx, CO, $H_2S$ and VOC by using an appropriate combination of the following techniques (see Section 4.2.6): | | |
| **68a** | (a) scrubbing the biogas with iron salts | No | |
| **68b** | (b) using de-NOx techniques such as SCR | No | |
| **68c** | (c) using a thermal oxidation unit | No | |

| BAT No. | BAT Description | Applicability Assessment<br>State "applicable" if the technique applies to your installation.<br>State "No" if not, and provide a comprehensive explanation[1]. | Status of technique at installation<br>If applicable, state "in place" if the technique is in place at your installation.<br>If not, state "not in place", the date it will be in place and a comprehensive explanation[1]. |
|---|---|---|---|
| **68d** | (d) using activated carbon filtration. | No | |
| **69** | Improve the mechanical biological treatments (MBT) by (see Sections 4.2.2, 4.2.3, 4.2.8, 4.2.10, 4.6.23): | | |
| **69a** | (a) using fully enclosed bioreactors. | No | |
| **69b** | (b) avoiding anaerobic conditions during aerobic treatment by controlling the digestion and the air supply (by using a stabilised air circuit) and by adapting the aeration to the actual biodegradation activity. | No | |
| **69c** | (c) using water efficiently. | No | |

| BAT No. | BAT Description | Applicability Assessment<br>State "applicable" if the technique applies to your installation.<br>State "No" if not, and provide a comprehensive explanation[1]. | Status of technique at installation<br>If applicable, state "in place" if the technique is in place at your installation.<br>If not, state "not in place", the date it will be in place and a comprehensive explanation[1]. |
|---|---|---|---|
| **69d** | (d) thermally insulating the ceiling of the biological degradation hall in aerobic processes. | No | |
| **69e** | (e) minimising the exhaust gas production to levels of 2500 to 8000 $Nm^3$ per tonne. Levels below 2500 $Nm^3$ per tonne do not have been reported. | No | |
| **69f** | (f) guaranteeing a uniform feed. | No | |
| **69g** | (g) recycling process waters or muddy residues within the aerobic treatment process to completely avoid water emissions. If waste water is generated, then this should be treated to reach the values mentioned in BAT number 56. | No | |
| **69h** | (h) continuously learning of the connection between the controlled variables of biological degradation and the measured (gaseous) emissions. | No | |

<table>
<tr><th>BAT No.</th><th>BAT Description</th><th>Applicability Assessment<br>State "applicable" if the technique applies to your installation.<br>State "No" if not, and provide a comprehensive explanation[1].</th><th>Status of technique at installation<br>If applicable, state "in place" if the technique is in place at your installation.<br>If not, state "not in place", the date it will be in place and a comprehensive explanation[1].</th></tr>
<tr><td>69i</td><td>(i) reducing emissions of nitrogen compounds by optimising the C:N ratio.</td><td>No</td><td></td></tr>
<tr><td>70</td><td>Reduce the emissions from mechanical biological treatments to the following levels (see Section 4.2.12) by using an appropriate combination of the following techniques:<br>(a) maintaining good housekeeping (related to BAT number 3).<br>(b) regenerative thermal oxidiser.<br>(c) dust removal.
<table>
<tr><th>Parameter</th><th>Treated exhaust gas</th></tr>
<tr><td>Odour (ouE/m$^3$)</td><td><500 – 6000</td></tr>
<tr><td>$NH_3$ (mg/m$^3$)</td><td><1 – 20</td></tr>
<tr><td colspan="2">For VOC and PM, see the generic BAT 41<br>The TWG recognised that $N_2O$ (see section 4.6.10) and Hg also needed to be added to this table, however not enough data were provided to validate values on these issues.</td></tr>
</table></td><td>No</td><td></td></tr>
<tr><td>71</td><td>Reduce the emissions to water to the levels mentioned in BAT number 56. In addition, restrict the emissions to water of total nitrogen, ammonia, nitrate and nitrite as well (see Section 4.7.7 and the concluding remarks Chapter 7).</td><td>No</td><td></td></tr>
</table>

| BAT No. | BAT Description | Applicability Assessment<br>State "applicable" if the technique applies to your installation.<br>State "No" if not, and provide a comprehensive explanation[1]. | Status of technique at installation<br>If applicable, state "in place" if the technique is in place at your installation.<br>If not, state "not in place", the date it will be in place and a comprehensive explanation[1]. |
|---|---|---|---|
| | **Physico-chemical treatments** | | |
| | For the physico-chemical treatment of waste waters, BAT is to: | | |
| **72** | Apply the following techniques in physico-chemical reactors (see Section 4.3.1.2): | | |
| **72a** | (a) Clearly defining the objectives and the expected reaction chemistry for each treatment process. | No | |
| **72b** | (b) Assessing each new set of reactions and proposed mixes of wastes and reagents in a laboratory-scale test prior to waste treatment. | No | |

| BAT No. | BAT Description | Applicability Assessment<br>State "applicable" if the technique applies to your installation.<br>State "No" if not, and provide a comprehensive explanation[1]. | Status of technique at installation<br>If applicable, state "in place" if the technique is in place at your installation.<br>If not, state "not in place", the date it will be in place and a comprehensive explanation[1]. |
|---|---|---|---|
| **72c** | (c) Specifically designing and operating the reactor vessel so that it is fit for its intended purpose. | No | |
| **72d** | (d) Enclosing all treatment/reaction vessels and ensuring that they are vented to the air via an appropriate scrubbing and abatement system. | No | |
| **72e** | (e) Monitoring the reaction to ensure that it is under control and proceeding towards the anticipated result. | No | |
| **72f** | (f) Preventing the mixing of wastes or other streams that contain metals and complexing agents at the same time (see Section 4.3.1.3). | No | |
| **73** | In addition to the generic parameters identified for waste water in BAT number 56, additional parameters need to be identified for the physico-chemical treatment of waste waters. Some reference is given on this issue in the concluding remark Chapter 7. | No | |

| BAT No. | BAT Description | Applicability Assessment<br>State "applicable" if the technique applies to your installation.<br>State "No" if not, and provide a comprehensive explanation[1]. | Status of technique at installation<br>If applicable, state "in place" if the technique is in place at your installation.<br>If not, state "not in place", the date it will be in place and a comprehensive explanation[1]. |
|---|---|---|---|
| **74** | Apply the following techniques for the neutralisation process (see Section 4.3.1.3) | | |
| **74a** | a. ensuring that the customary measurement methods are used | No | |
| **74b** | b. separately storing the neutralised waste water | No | |
| **74c** | c. performing a final inspection of the neutralised waste water after a sufficient storage time has elapsed. | No | |
| **75** | Apply the following techniques to aid precipitation of the metals in treatment processes (see Section 4.3.1.4): | | |

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|---|---|---|---|
| **75a** | a. adjusting the pH to the point of minimum solubility where the metals will precipitate | No | |
| **75b** | b. avoiding the input of complexing agents, chromates and cyanides | No | |
| **75c** | c. avoiding organic materials that may interfere with precipitation from entering the process | No | |
| **75d** | d. allowing the resulting treated waste to clarify by decantation when possible, and/or by the addition of other dewatering equipment | No | |
| **75e** | e. using sulphidic precipitation if complex agents are present. This technique may increase the sulphide concentration in the treated waste water. | No | |

| BAT No. | BAT Description | Applicability Assessment<br>State "applicable" if the technique applies to your installation.<br>State "No" if not, and provide a comprehensive explanation[1]. | Status of technique at installation<br>If applicable, state "in place" if the technique is in place at your installation.<br>If not, state "not in place", the date it will be in place and a comprehensive explanation[1]. |
|---|---|---|---|
| **76** | Apply the following techniques to break-up emulsions (see Section 4.3.1.5): | | |
| **76a** | a. testing for the presence of cyanides in the emulsions to be treated. If cyanides are present, the emulsions need a special pre-treatment first. | No | |
| **76b** | b. setting up simulated laboratory tests. | No | |
| **77** | Apply the following techniques to oxidation/reduction (see Section 4.3.1.6): | No | |
| **77a** | a. abating the air emissions generated during the oxidation/reduction | No | |

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|---|---|---|---|
| **77b** | b. having safety measures and gas detectors in place (e.g. suitable for detecting HCN, H2S, NOx). | No | |
| **78** | apply the following techniques to waste waters containing cyanides (see Section 4.3.1.7): | | |
| **78a** | a. destroying the cyanides by oxidation | No | |
| **78b** | b. adding caustic soda in excess to prevent a decrease in pH | No | |
| **78c** | c. avoiding the mixing of cyanide wastes with acidic compounds | No | |

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|---|---|---|---|
| **78d** | d. monitoring the progress of the reaction using electropotentials. | No | |
| **79** | Apply the following techniques to waste waters containing chromium (VI) compounds (see Section 4.3.1.8): | | |
| **79a** | a. avoiding the mixing of Cr(VI) wastes with other wastes | No | |
| **79b** | b. reducing Cr(VI) to Cr(III) | No | |
| **79c** | c. precipitating the trivalent metal. | No | |

| BAT No. | BAT Description | Applicability Assessment<br>State "applicable" if the technique applies to your installation.<br>State "No" if not, and provide a comprehensive explanation[1]. | Status of technique at installation<br>If applicable, state "in place" if the technique is in place at your installation.<br>If not, state "not in place", the date it will be in place and a comprehensive explanation[1]. |
|---|---|---|---|
| **80** | Apply the following techniques to waste waters containing nitrites (see Section 4.3.1.9): | | |
| **80a** | a. avoiding mixing nitrite wastes with other wastes | No | |
| **80b** | b. checking and avoiding nitrous fumes during the oxidation/acidification treatment of nitrites. | No | |
| **81** | Apply the following techniques to waste waters containing ammonia (see Section 4.3.1.11): | | |
| **81a** | a. using a dual column air stripping system with an acidic scrubber for waste with ammonia solutions up to 20 w/w-% | No | |

| BAT No. | BAT Description | Applicability Assessment<br>State "applicable" if the technique applies to your installation.<br>State "No" if not, and provide a comprehensive explanation[1]. | Status of technique at installation<br>If applicable, state "in place" if the technique is in place at your installation.<br>If not, state "not in place", the date it will be in place and a comprehensive explanation[1]. |
|---|---|---|---|
| **81b** | b. recovering the ammonia in the scrubbers and returning it to the process prior to the settlement stage | No | |
| **81c** | c. removing the ammonia removed in the gas phase by scrubbing the waste with sulphuric acid to produce ammonium sulphate | No | |
| **81d** | d. extending any air sampling for ammonia in exhaust stacks or filter press areas to cover the VOCs in filtration and dewatering (see Section 4.3.1.12). | No | |
| **82** | Link the air space above filtration and dewatering processes to the main abatement system of the plant (see Section 4.3.1.12) | No | |
| **83** | Add flocculation agents to the sludge and waste water to be treated, to accelerate the sedimentation process and to facilitate the further separation of solids (see Section 4.3.1.16 for some applicability restrictions identified). To avoid use of flocculation agents, evaporation is better in those cases where it is economically viable (see Section 4.7.6.1) | No | |

| BAT No. | BAT Description | Applicability Assessment<br>State "applicable" if the technique applies to your installation.<br>State "No" if not, and provide a comprehensive explanation[1]. | Status of technique at installation<br>If applicable, state "in place" if the technique is in place at your installation.<br>If not, state "not in place", the date it will be in place and a comprehensive explanation[1]. |
|---|---|---|---|
| **84** | Apply rapid cleaning and steam or high pressure water jet cleaning of the filter apertures of the sieving processes (see Section 4.3.1.17). | No | |
| | For the physico-chemical treatment of solid wastes, BAT is to: | | |
| **85** | Promote the insolubilisation of amphoteric metals, and to reduce the leaching of toxic soluble salts by a suitable combination of water washing, evaporation, recrystallisation and acid extraction (see Section 4.3.2.1, 4.3.2.8, 4.3.2.9) when inmobilisation is used to treat solid waste containing hazardous compounds for landfilling | No | |
| **86** | Test the leachability of inorganic compounds, by using the standardised CEN leaching procedures and by applying the appropriate testing level: basic characterisation, compliance testing or on-site verification (see Section 4.3.2.2) | No | |
| **87** | Restrict the acceptance of wastes to be treated by solidification/immobilisation treatment to those not containing high levels of VOCs, odorous components, solid cyanides, oxidising agents, chelating agents, high TOC wastes and gas cylinders (see Section 4.3.2.3) | No | |

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|---|---|---|---|
| **88** | Apply control and enclosure techniques for loading/unloading and enclosed conveyor systems (see Section 4.3.2.3) | No | |
| **89** | Have an abatement system(s) in place to handle the flow of air as well as the peak loadings associated with charging and unloading (see Section 4.3.2.3) | No | |
| **90** | Use at least a solidification, vitrification, melting or fusion process before landfilling solid waste according to techniques in Sections from 4.3.2.4 to 4.3.2.7. | No | |
| | For the physico-chemical treatment of contaminated soil, BAT is to: | | |
| **91** | Control the rate of excavation, the amount of contaminated soil area that is exposed, and the duration that soil piles are left uncovered during the excavation and removal of contaminated soil (see Section 4.3.2.10) | No | |

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|---|---|---|---|
| **92** | Use a bench-scale test to determine the suitability of the process to be applied and the best operational conditions for its use (see Section 4.3.2.11) | No | |
| **93** | Have collection and control equipment in place such as afterburners, thermal oxidisers, fabric filters, activated carbon, or condensers for the treatment of the gases from thermal treatments (see Section 4.3.2.11) | No | |
| **94** | Report the efficiency achieved during the processes for the different components reduced and also for those that have not been affected by the process (see Section 4.3.2.3) | No | |
| | **Recovery of materials from waste** | [redacted] | |
| | For the re-refining of waste oils, BAT is to: | | |

| BAT No. | BAT Description | Applicability Assessment<br>State "applicable" if the technique applies to your installation.<br>State "No" if not, and provide a comprehensive explanation[1]. | Status of technique at installation<br>If applicable, state "in place" if the technique is in place at your installation.<br>If not, state "not in place", the date it will be in place and a comprehensive explanation[1]. |
|---|---|---|---|
| **95** | Operate a careful control of the incoming materials supported by analytical equipment (viscometry, infrared, chromatography and mass spectrometry as appropriate), laboratories and resources (see Section 4.1.1.1) | No | |
| **96** | Check at least for chlorinated solvents and PCBs (see Sections 4.1.1.1 and 4.4.1.2) | No | |
| **97** | Use condensation as a treatment for the gas phase of the flash distillation unit (see Section 4.6.8) | No | |
| **98** | Have vapour return lines for loading and unloading vehicles, routing all vents to a thermal oxidiser/incinerator or an activated carbon adsorption installation (see Sections 4.1.4.6, 4.6.7 and 4.6.14) | No | |
| **99** | Direct vent streams to a thermal oxidiser with waste gas treatment if chlorinated species are present in the vent stream. If high levels of chlorinated species are present then condensation followed by caustic scrubbing and an activated carbon guard bed is the preferred treatment path (see Section 4.6) | No | |

| BAT No. | BAT Description | Applicability Assessment<br>State "applicable" if the technique applies to your installation.<br>State "No" if not, and provide a comprehensive explanation[1]. | Status of technique at installation<br>If applicable, state "in place" if the technique is in place at your installation.<br>If not, state "not in place", the date it will be in place and a comprehensive explanation[1]. |
|---|---|---|---|
| **100** | Utilise a thermal oxidation at 850 °C with a two seconds residence time for the vacuum distillation vent of vacuum generators or for the air from process heaters (see Section 4.6) | No | |
| **101** | Use a highly efficient vacuum system (see Section 4.4.1.1) | No | |
| **102** | Use the residues from vacuum distillation or thin film evaporators as asphalt products (see Section 4.4.1.15) | No | |
| **103** | Use a re-refining process of waste oil which can achieve a yield higher than 65 % on a dry basis (see Sections from 4.4.1.1 to 4.4.1.12) | No | |
| **104** | Achieve the following values in the discharged waste water from the re-refining unit (see Section 4.4.1.14) by using a suitable combination of process-integrated techniques and/or primary, secondary, biological and finishing treatments (see Sections 4.4.1.14 and 4.7):<br>**Waste water parameter** / **Concentration (ppm)**<br>Hydrocarbons / <0.01 – 5<br>Phenols / 0.15 – 0.45<br>For other water parameters, refer to BAT number 56 in the Generic BAT section | No | |

| BAT No. | BAT Description | Applicability Assessment<br>State "applicable" if the technique applies to your installation.<br>State "No" if not, and provide a comprehensive explanation[1]. | Status of technique at installation<br>If applicable, state "in place" if the technique is in place at your installation.<br>If not, state "not in place", the date it will be in place and a comprehensive explanation[1]. |
|---|---|---|---|
| | For the treatment of waste solvent, BAT is to: | | |
| **105** | Operate a careful control of the incoming materials as supported by analytical equipment, laboratories and resources (see Section 4.1.1.1) | No | |
| **106** | Evaporate the residue from the distillation columns and to recuperate the solvents (see Section 4.4.2.4) | No | |
| | For the regeneration of waste catalyst, BAT is to: | | |
| **107** | Use bag filters to abate particulates from the fumes generated during the regeneration process (see Sections 4.4.3 and 4.6.5) | No | |

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|---|---|---|---|
| **108** | Use a SOx abatement system (see Section 4.4.3.3). | No | |
| | For the regeneration of waste activated carbon, BAT is to: | | |
| **109** | Have an effective quality control procedure in place to ensure that the operator can differentiate between the carbon used for potable water or food grade carbon and the rest of<br>spent carbons (the so-called 'industrial carbons') (see Section 4.4.4.2) | No | |
| **110** | Require a written undertaking from customers indicating what the activated carbon has been<br>used for (see Section 4.1.2.3 and this is also related to BAT number 12.c) | No | |
| **111** | Utilise an indirect fired kiln for industrial carbons –it may be argued that this could equally be applied to potable water carbons. However, limits on capacity and corrosion may deem that only multiple hearth or direct fired rotary kilns may be used (see Section 4.4.4.1) | No | |

| BAT No. | BAT Description | Applicability Assessment<br>State "applicable" if the technique applies to your installation.<br>State "No" if not, and provide a comprehensive explanation[1]. | Status of technique at installation<br>If applicable, state "in place" if the technique is in place at your installation.<br>If not, state "not in place", the date it will be in place and a comprehensive explanation[1]. |
|---|---|---|---|
| **112** | Utilise an afterburner with a minimum of 1100 °C, two seconds residence time and 6 % excess oxygen for the regeneration of industrial carbons where refractory halogenated or other thermally resistant substances are likely to be present. In other cases, less stringent thermal conditions are sufficient (see Section 4.4.4.2) | No | |
| **113** | Utilise an afterburner with a minimum heating temperature of 850 °C, two seconds residence time and 6 % excess oxygen for potable water and food grade active carbons (see Section 4.4.4.2) | No | |
| **114** | Apply a flue-gas treatment train consisting of quench and/or venturi and aqueous scrubbing sections, followed by an induced draft fan (see Section 4.4.4.2) | No | |
| **115** | Utilise a caustic or soda ash scrubbing solutions to neutralise acid gases for industrial carbon plants (see Section 4.4.4.2) | No | |
| **116** | Have a WWTP containing an appropriate combination of flocculation, settlement, filtration and pH adjustment for the treatment of potable water carbons. For effluents of industrial carbons, applying additional treatments (e.g. metal hydroxide precipitation, sulphide precipitation) are also considered BAT (see Section 4.4.4.3) | No | |

| BAT No. | BAT Description | Applicability Assessment<br>State "applicable" if the technique applies to your installation.<br>State "No" if not, and provide a comprehensive explanation[1]. | Status of technique at installation<br>If applicable, state "in place" if the technique is in place at your installation.<br>If not, state "not in place", the date it will be in place and a comprehensive explanation[1]. |
|---|---|---|---|
| | **Preparation of waste to be used as fuel** | | |
| | For the preparation of waste to be used as fuel, BAT is to: | | |
| **117** | Try to have a close relationship with the waste fuel user in order that a proper transfer of the<br>knowledge of the waste fuel composition is carried out (see Section 4.5.1) | No | |
| **118** | Have a quality assurance system to guarantee the characteristics of the waste fuel produced (see Section 4.5.1) | No | |
| **119** | Manufacture different type of waste fuels according to the type of user (e.g. cement kilns, different power plants), to the type of furnace (e.g. grate firing, blow feeding) and to the type of waste used to manufacture the waste (e.g. hazardous waste, municipal solid waste) (see Section 4.5.2) | No | |

| BAT No. | BAT Description | Applicability Assessment<br>State "applicable" if the technique applies to your installation.<br>State "No" if not, and provide a comprehensive explanation[1]. | Status of technique at installation<br>If applicable, state "in place" if the technique is in place at your installation.<br>If not, state "not in place", the date it will be in place and a comprehensive explanation[1]. |
|---|---|---|---|
| **120** | *When producing waste fuel from hazardous waste, use activated carbon treatment for low contaminated water and thermal treatment for highly polluted water (see Sections 4.5.6 and 4.7). In this context, thermal treatment relates to any thermal treatment in Section 4.7.6 or incineration which is not covered in this document* | No | |
| **121** | *When producing waste fuel from hazardous waste, ensure correct follow-up of the rules concerning electrostatic and flammability hazards for safety reasons (see Sections 4.1.2.7 and 4.1.7)* | No | |
| | For the preparation of solid waste fuels from non-hazardous waste, BAT is to: | | |
| **122** | Visually inspect the incoming waste to sort out the bulky metallic or non-metallic parts. The purpose is to protect the plant against mechanical destruction (see Section 4.1.1.3 and this is also related to BAT 8.e) | No | |
| **123** | Use magnetic ferrous and non-ferrous metal separators. The purpose is to protect the pelletisers as well as fulfil the requirements of the final users (see Sections 4.5.3.3 and 4.5.3.4) | No | |

| BAT No. | BAT Description | Applicability Assessment<br>State "applicable" if the technique applies to your installation.<br>State "No" if not, and provide a comprehensive explanation[1]. | Status of technique at installation<br>If applicable, state "in place" if the technique is in place at your installation.<br>If not, state "not in place", the date it will be in place and a comprehensive explanation[1]. |
|---|---|---|---|
| **124** | Make use of the NIR technique for the sorting out of plastics. The purpose is the reduction of organic chlorine and some metals which are part of the plastics (see Section 4.5.3.10) | No | |
| **125** | Use a combination of shredder systems and pelletisers suitable for the preparation of the specified size waste fuel (see Sections 4.5.3.1 and 4.5.3.12) | No | |
| | For some installations preparing solid waste fuels from source-separated waste streams, the use of some or all of the above-mentioned techniques may not be necessary to comply with BAT (see Section 4.5.3.1) | [redacted] | |
| | *For the preparation of solid waste fuel from hazardous waste, BAT is to:* | | |
| **126** | *Consider emissions and flammability hazards in case a drying or heating operation is required (see Sections 4.1.2.7 and 4.5.4.1)* | No | |

| BAT No. | BAT Description | Applicability Assessment<br>State "applicable" if the technique applies to your installation.<br>State "No" if not, and provide a comprehensive explanation[1]. | Status of technique at installation<br>If applicable, state "in place" if the technique is in place at your installation.<br>If not, state "not in place", the date it will be in place and a comprehensive explanation[1]. |
|---|---|---|---|
| **127** | *Consider carrying out the mixing and blending operations in closed areas with appropriate atmosphere control systems (see Sections 4.1.4.5, 4.5.4.1 and 4.6)* | No | |
| **128** | *Use bags filters for the abatement of particulates (see Section 4.6.26)* | No | |
| | *For the preparation of liquid waste fuels from hazardous waste, BAT is to:* | | |
| **129** | *Use heat-exchange units external to the vessel if heating of the liquid fuel is required (Section 4.5.4.1)* | No | |
| **130** | *Adapt the suspended solid content to ensure the homogeneity of the liquid fuel (see Section 4.5.4.1)* | No | |

# Conclusions on BAT from the Emissions from Storage BAT Reference Document

## READ ME:

The '*Conclusions on BAT from the Emissions from Storage BAT Reference Document'* is a horizontal BREF as it addresses the storage and the transfer/handling of liquids, liquefied gases and solids regardless of the sector or industry.

In this case, you are required to identify the Conclusions on BAT relevant to your installation. Please use the '**Scope**' box to describe the relevant activities/processes that come within the scope of this BREF and clearly identify the Conclusions on BAT (sections and subsections) that are **'Not Applicable'**.

For each applicable BAT, in the following table, state the status; **'Yes'** or **'Will be'** as appropriate in the '**State whether it is Yes or state schedule for implementation**' box. The use of each of these terms is described below.

Information on compliance in the '**Applicability Assessment**' box should include, where applicable, the following:

(i) Identification of the relevant process/ activity or individual emission points that the BAT requirement applies to at your installation;

(ii) Where BAT is to use one or a combination of listed techniques, specify the technique(s) implemented/proposed at your installation to achieve the BAT; and

(iii) A comment on how the requirements are being met or will be met, e.g., a description of the technology/operational controls/management proposed to meet the requirements.



Use of terms:

(a) '**Yes**' – To be entered where the installation is currently complaint with this BAT requirement.

(b) '**Will be**' – To be entered where a further technique is required to be installed to achieve compliance with the BAT requirement. In this case you must also specify the date by which the installation will comply with the BAT Conclusion requirement.

Please refer to the EPA BAT Guidance Note(s) for BAT associated emission levels. EPA BAT Guidance Notes are the reference for setting emission limit values (without prejudice to the requirements of environmental quality standards).

BAT Guidance Notes are available on the EPA website.

## Conclusions on BAT from the Emissions from Storage BAT Reference Document (extracts)

The full and complete Emissions from Storage BAT reference document (July 2006) is available at the EIPPC Bureau website:
http://eippcb.jrc.ec.europa.eu/reference/

SCOPE

*Identify here the particular processes and activities at the installation that come within the scope of the conclusions on BAT from the Emissions from Storage BAT reference documents (BREF).*



| Conclusions on BAT | Applicability Assessment (describe how the technique applies or not to your installation) | State whether it is Yes or state schedule for implementation |
|---|---|---|
| **5.1 Storage of liquids and Liquefied gases**<br>**5.1.1.1 General principles to prevent and reduce emissions** | | |
| **BAT 1.**<br>BAT for a proper design is to take into account at least the following:<br>• the physico-chemical properties of the substance being stored<br>• how the storage is operated, what level of instrumentation is needed, how many operators are required, and what their workload will be<br>• how the operators are informed of deviations from normal process conditions (alarms)<br>• how the storage is protected against deviations from normal process conditions (safety instructions, interlock systems, pressure relief devices, leak detection and containment, etc.)<br>• what equipment has to be installed, largely taking account of past experiences of the product (construction materials, valve quality, etc.) | Applicable | Yes |

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| • which maintenance and inspection plan needs to be implemented and how to ease the maintenance and inspection work (access, layout, etc.)<br>• how to deal with emergency situations (distances to other tanks, facilities and to the boundary, fire protection, access for emergency services such as the fire brigade, etc.). | | |
| **BAT 2.**<br>BAT is to apply a tool to determine proactive maintenance plans and to develop risk-based inspection plans such as the risk and reliability based maintenance approach; see Section 4.1.2.2.1. | Applicable | Yes |
| **BAT3.**<br>BAT is to locate a tank operating at, or close to, atmospheric pressure aboveground. However, for storing flammable liquids on a site with restricted space, underground tanks can also be considered. For liquefied gases, underground, mounded storage or spheres can be considered, depending on the storage volume. | Not Applicable. No storage tanks at the installation | |
| **BAT 4.**<br>BAT is to apply either a tank colour with a reflectivity of thermal or light radiation of at least 70 %, or a solar shield on aboveground tanks which contain volatile substances, see Section 4.1.3.6 or 4.1.3.7 respectively. | Not Applicable-VOC not stored in tanks at the site. | |
| **BAT 5.**<br>BAT is to abate emissions from tank storage, transfer and handling that have a significant negative environmental effect, as described in Section 4.1.3.1 | | |
| **BAT 6.**<br>On sites where significant VOC emissions are to be expected, BAT includes calculating the VOC emissions regularly. | Not Applicable-VOC not stored in tanks at the site. | |
| **BAT 7.**<br>BAT is to apply dedicated systems; see Section 4.1.4.4. | Applicable | Yes |
| **5.1.1.2 Tank specific considerations** | | |
| ***Open top tanks***<br>**BAT 8.**<br>If emissions to air occur, BAT is to cover the tank by applying:<br>• a floating cover, see Section 4.1.3.2<br>• a flexible or tent cover, see Section 4.1.3.3, or | Not Applicable-No open top tanks at the site. | |

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| • a rigid cover, see Section 4.1.3.4.<br>Additionally, with an open top tank covered with a flexible, tent or a rigid cover, a vapour treatment installation can be applied to achieve an additional emission reduction, see Section 4.1.3.15. The type of cover and the necessity for applying the vapour treatment system depend on the substances stored and must be decided on a case-by-case basis. | | |
| **BAT 9.**<br>To prevent deposition that would call for an additional cleaning step, BAT is to mix the stored substance (e.g. slurry), see Section 4.1.5.1. | Not Applicable-Tank cleaning is not required | |
| ***External floating roof tank***<br>**BAT 10.**<br>The BAT associated emission reduction level for a large tank is at least 97 % (compared to a fixed roof tank without measures), which can be achieved when over at least 95 % of the circumference the gap between the roof and the wall is less than 3.2 mm and the seals are liquid mounted, mechanical shoe seals. | Not Applicable-No floating roof tanks at the site. | |
| **BAT 11.**<br>BAT is to apply direct contact floating roofs (double-deck), however, existing non-contact floating roofs (pontoon) are also BAT. See Section 3.1.2. A dome can be BAT for adverse weather conditions, such as high winds, rain or snowfall. See Section 4.1.3.5. | Not Applicable-No floating roof tanks at the site. | |
| **BAT 12.**<br>For liquids containing a high level of particles (e.g. crude oil), BAT is to mix the stored substance to prevent deposition that would call for an additional cleaning step, see Section 4.1.5.1. | Not Applicable-Tank cleaning is not required | |
| ***Fixed roof tanks***<br>**BAT 13.**<br>For the storage of volatile substances which are toxic (T), very toxic (T+), or carcinogenic, mutagenic and reproductive toxic (CMR) categories 1 and 2 in a fixed roof tank, BAT is to apply a vapour treatment installation. | Not Applicable. Volatile substances which are toxic (T), very toxic (T+), or carcinogenic, mutagenic and reproductive toxic (CMR) categories 1 and 2 are not stored in a fixed roof tank. | |
| **BAT 14.**<br>For other substances, BAT is to apply a vapour treatment installation, or to install an internal floating roof (see Sections 4.1.3.15 and 4.1.3.10 respectively). Direct contact floating roofs and non-contact floating roofs are BAT. | Not Applicable for the substances stored in tanks at the site. | |

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| **BAT 15.**<br>For tanks < 50 $m^3$, BAT is to apply a pressure relief valve set at the highest possible value consistent with the tank design criteria. | Not Applicable | |
| **BAT 16.**<br>For liquids containing a high level of particles (e.g. crude oil) BAT is to mix the stored substance to prevent deposition that would call for an additional cleaning step, see Section 4.1.5.1. | Not Applicable, | |
| ***Atmospheric horizontal tanks***<br>**BAT 17.**<br>For the storage of volatile substances which are toxic (T), very toxic (T+), or CMR categories 1 and 2 in an atmospheric horizontal tank, BAT is to apply a vapour treatment installation. | Not Applicable as there are no atmospheric horizontal tanks at the site. | |
| **BAT 18.**<br>For other substances, BAT is to do all, or a combination, of the following techniques, depending on the substances stored:<br>• apply pressure vacuum relief valves; see Section 4.1.3.11<br>• up rate to 56 mbar; see Section 4.1.3.11<br>• apply vapour balancing; see Section 4.1.3.13<br>• apply a vapour holding tank, see Section 4.1.3.14, or<br>• apply vapour treatment; see Section 4.1.3.15.<br>The selection of the vapour treatment technology has to be decided on a case-by-case basis. | Not Applicable | |
| ***Pressurised storage***<br>**BAT 19.**<br>BAT for draining depends on the tank type, but may be the application of a closed drain system connected to a vapour treatment installation, see Section 4.1.4. The selection of the vapour treatment technology has to be decided on a case-by-case basis. | Not Applicable. No liquid pressurised storage tanks at the site. | |
| ***Lifter roof tanks***<br>**BAT 20.**<br>For emissions to air, BAT is to (see Sections 3.1.9 and 4.1.3.14):<br>• apply a flexible diaphragm tank equipped with pressure/vacuum relief valves, or<br>• apply a lifter roof tank equipped with pressure/vacuum relief valves and connected | Not Applicable. No lifter roof tanks at the site. | |

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| to a vapour treatment installation.<br>The selection of the vapour treatment technology has to be decided on a case-by-case basis. | | |
| ***Underground and mounded tanks***<br>**BAT 21.**<br>For the storage of volatile substances which are toxic (T), very toxic (T+), or CMR categories 1 and 2 in an underground or mounded tank, BAT is to apply a vapour treatment installation. | Not Applicable. Volatile substances which are toxic (T), very toxic (T+), or carcinogenic, mutagenic and reproductive toxic (CMR) categories 1 and 2 are not stored in an underground tank. | |
| **BAT 22.**<br>For other substances, BAT is to do all, or a combination, of the following techniques, depending on the substances stored:<br>• apply pressure vacuum relief valves; see Section 4.1.3.11<br>• apply vapour balancing; see Section 4.1.3.13<br>• apply a vapour holding tank, see Section 4.1.3.14, or<br>• apply vapour treatment; see Section 4.1.3.15.<br>The selection of the vapour treatment technology has to be decided on a case-by-case basis. | Not Applicable. No underground storage tanks for raw materials/intermediates/ products on site. | |
| **5.1.1.3 Preventing incidents and (major) accidents** | | |
| **BAT 23.**<br>BAT in preventing incidents and accidents is to apply a safety management system as described in Section 4.1.6.1. | Applicable | Yes |
| **BAT 24.**<br>BAT is to implement and follow adequate organisational measures and to enable training and instruction of employees for safe and responsible operation of the installation as described in Section 4.1.6.1.1. | Applicable | Yes |
| **BAT 25.**<br>BAT is to prevent corrosion by:<br>• selecting construction material that is resistant to the product stored<br>• applying proper construction methods<br>• preventing rainwater or groundwater entering the tank and if necessary, removing water that has accumulated in the tank<br>• applying rainwater management to bund drainage | Applicable | Yes |

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| • applying preventive maintenance, and<br>• where applicable, adding corrosion inhibitors, or applying cathodic protection on the inside of the tank. | | |
| **BAT 26.**<br>Additionally for an underground tank, BAT is to apply to the outside of the tank:<br>• a corrosion-resistant coating<br>• plating, and/or<br>• a cathodic protection system. | Not Applicable. No underground storage tanks for raw materials/intermediates/ products on site. | |
| **BAT 27.**<br>BAT is to prevent stress corrosion cracking (SCC) by:<br>• stress relieving by post-weld heat treatment, see Section 4.1.6.1.4, and<br>• applying a risk based inspection as described in Section 4.1.2.2.1. | Applicable | Yes |
| **BAT 28.**<br>BAT is to implement and maintain operational procedures – e.g. by means of a management system – as described in Section 4.1.6.1.5, to ensure that:<br>• high level or high pressure instrumentation with alarm settings and/or auto closing of valves is installed<br>• proper operating instructions are applied to prevent overfill during a tank filling operation, and<br>• sufficient ullage is available to receive a batch filling. | Not Applicable | |
| **BAT 29.**<br>BAT is to apply leak detection on storage tanks containing liquids that can potentially cause soil pollution. | Not Applicable | |
| **BAT 30.**<br>BAT is to achieve a 'negligible risk level' of soil pollution from bottom and bottom-wall connections of aboveground storage tanks. However, on a case-by-case basis, situations might be identified where an 'acceptable risk level' is sufficient. | Not Applicable | |
| **BAT 31.**<br>BAT for aboveground tanks containing flammable liquids or liquids that pose a risk for significant soil pollution or a significant pollution of adjacent watercourses is to provide secondary containment, such as:<br>• tank bunds around single wall tanks; see Section 4.1.6.1.11<br>• double wall tanks; see Section 4.1.6.1.13 | Not Applicable | |

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| • cup-tanks; see Section 4.1.6.1.14<br>• double wall tanks with monitored bottom discharge; see Section 4.1.6.1.15. | | |
| **BAT 32.**<br>For building new single walled tanks containing liquids that pose a risk for significant soil pollution or a significant pollution of adjacent watercourses, BAT is to apply a full, impervious, barrier in the bund, see Section 4.1.6.1.10. | Not Applicable | |
| **BAT 33.**<br>For existing tanks within a bund, BAT is to apply a risk-based approach, considering the significance of risk from product spillage to the soil, to determine if and which barrier is best applicable. This risk-based approach can also be applied to determine if a partial impervious barrier in a tank bund is sufficient or if the whole bund needs to be equipped with an impervious barrier. See Section 4.1.6.1.11. | Not Applicable | |
| **BAT 34.**<br>For chlorinated hydrocarbon solvents (CHC) in single walled tanks, BAT is to apply CHC-proof laminates to concrete barriers (and containments), based on phenolic or furan resins. One form of epoxy resin is also CHC-proof. See Section 4.1.6.1.12. | Not Applicable as CHC are not used at the site. | |
| **BAT 35.**<br>BAT for underground and mounded tanks containing products that can potentially cause soil pollution is to:<br>• apply a double walled tank with leak detection, see Section 4.1.6.1.16, or<br>• to apply a single walled tank with secondary containment and leak detection, see Section 4.1.6.1.17. | Not Applicable-No underground product storage tanks. | |
| **BAT 36.**<br>For toxic, carcinogenic or other hazardous substances, BAT is to apply full containment. | Applicable | Yes |
| **5.1.2. Storage of packaged dangerous substances** | | |
| **BAT 37.**<br>BAT in preventing incidents and accidents is to apply a safety management system as described in Sections 4.1.6.1.<br>The minimum level of BAT is to assess the risks of accidents and incidents on the site using the five steps described in Section 4.1.6.1 | Applicable. . | Yes |

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| **BAT 38**.<br>BAT is to appoint a person or persons who is or are responsible for the operation of the store. | Applicable | Yes |
| **BAT 39.**<br>BAT is to provide the responsible person(s) with specific training and retraining in emergency procedures as described in Section 4.1.7.1 and to inform other staff on the site of the risks of storing packaged dangerous substances and the precautions necessary to safely store substances that have different hazards. | Applicable | Yes |
| **BAT 40.**<br>BAT is to apply a storage building and/or an outdoor storage area covered with a roof, as described in Section 4.1.7.2. For storing quantities of less than 2500 litres or kilograms dangerous substances, applying a storage cell as described in Section 4.1.7.2 is also BAT. | Applicable | Yes |
| **BAT 41**.<br>BAT is to separate the storage area or building of packaged dangerous substances from other storage, from ignition sources and from other buildings on- and off-site by applying a sufficient distance, sometimes in combination with fire-resistant walls. | Applicable | Yes |
| **BAT 42.**<br>BAT is to separate and/or segregate incompatible substances. For the compatible and incompatible combinations see Annex 8.3. | Applicable | Yes |
| **BAT 43.**<br>BAT is to install a liquid-tight reservoir according to Section 4.1.7.5, that can contain all or a part of the dangerous liquids stored above such a reservoir. The choice whether all or only a part of the leakage needs to be contained depends on the substances stored and on the location of the storage (e.g. in a water catchment area) and can only be decided on a case-by-case basis. | Applicable | Yes |
| **BAT 44.**<br>BAT is to install a liquid-tight extinguishant collecting provision in storage buildings and storage areas according to Section 4.1.7.5. The collecting capacity depends on the substances stored, the amount of substances stored, the type of package used and the applied fire-fighting system and can only be decided on a case-by-case basis. | Applicable | Yes |

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| **BAT 45.**<br>BAT is to apply a suitable protection level of fire prevention and fire-fighting measures as described in Section 4.1.7.6. The appropriate protection level has to be decided on a case-by-case basis in agreement with the local fire brigade. | Applicable | Yes |
| **BAT 46.**<br>BAT is to prevent ignition at source as described in Section 4.1.7.6.1. | Applicable | Yes |
| **5.1.3 Basins and lagoons** | | |
| **BAT 47.**<br>Where emissions to air from normal operation are significant, e.g. with the storage of pig slurry, BAT is to cover basins and lagoons using one of the following options:<br>• a plastic cover; see Section 4.1.8.2<br>• a floating cover; see Section 4.1.8.1, or<br>• only small basins, a rigid cover; see Section 4.1.8.2.<br>Additionally, where a rigid cover is used, a vapour treatment installation can be applied to achieve an extra emission reduction, see Section 4.1.3.15. The need for and type of vapour treatment must be decided on a case-by-case basis. | Not Applicable. No basins or lagoons at the site. | |
| **BAT 48.**<br>To prevent overfilling due to rainfall in situations where the basin or lagoon is not covered, BAT is to apply a sufficient freeboard, see Section 4.1.11.1. | Not Applicable. No basins or lagoons at the site. | |
| **BAT 49.**<br>Where substances are stored in a basin or lagoon with a risk of soil contamination, BAT is to apply an impervious barrier. This can be a flexible membrane, a sufficient clay layer or concrete, see Section 4.1.9.1 | Not Applicable. No basins or lagoons at the site. | |
| **5.2 Transfer and handling of liquids and liquefied gases**<br>**5.2.1 General principles to prevent and reduce emissions** | | |
| **BAT 50.**<br>BAT is to apply a tool to determine proactive maintenance plans and to develop risk-based inspection plans such as, the risk and reliability based maintenance approach; see Section 4.1.2.2.1. | Applicable | Yes |
| **BAT 51.**<br>For large storage facilities, according to the properties of the products stored, BAT is to apply a leak detection and repair programme. Focus needs to be on those | Not applicable. Site is not a large storage facility. | |

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| situations most likely to cause emissions (such as gas/light liquid, under high pressure and/or temperature duties). See Section 4.2.1.3. | | |
| **BAT 52.**<br>BAT is to abate emissions from tank storage, transfer and handling that have a significant negative environmental effect, as described in Section 4.1.3.1. | Applicable | Yes |
| **BAT 53.**<br>BAT in preventing incidents and accidents is to apply a safety management system as described in Section 4.1.6.1. | Applicable | Yes |
| **BAT 54.**<br>BAT is to implement and follow adequate organisational measures and to enable the training and instruction of employees for safe and responsible operation of the installation as described in Section 4.1.6.1.1. | Applicable | Yes |
| **5.2.2 Considerations on transfer and handling techniques**<br>**5.2.2.1 Piping** | | |
| **BAT 55.**<br>BAT is to apply aboveground closed piping in new situations, see Section 4.2.4.1. For existing underground piping it is BAT to apply a risk and reliability based maintenance approach as described in Section 4.1.2.2.1. | Applicable | Will be |
| **BAT 56.**<br>BAT is to minimise the number of flanges by replacing them with welded connections, within the limitation of operational requirements for equipment maintenance or transfer system flexibility, see Section 4.2.2.1. | Applicable | Will be |
| **BAT 57.**<br>BAT for bolted flange connections (see Section 4.2.2.2.) include:<br>• fitting blind flanges to infrequently used fittings to prevent accidental opening<br>• using end caps or plugs on open-ended lines and not valves<br>• ensuring gaskets are selected appropriate to the process application<br>• ensuring the gasket is installed correctly<br>• ensuring the flange joint is assembled and loaded correctly<br>• where toxic, carcinogenic or other hazardous substances are transferred, fitting high integrity gaskets, such as spiral wound, kammprofile or ring joints. | Applicable | Will be |

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| **BAT 58.**<br>BAT is to prevent corrosion by:<br>• selecting construction material that is resistant to the product<br>• applying proper construction methods<br>• applying preventive maintenance, and<br>• where applicable, applying an internal coating or adding corrosion inhibitors. | Applicable | Will be |
| **BAT 59.**<br>To prevent the piping from external corrosion, BAT is to apply a one, two, or three layer coating system depending on the site-specific conditions (e.g. close to sea). Coating is normally not applied to plastic or stainless steel pipelines. See Section 4.2.3.2. | Applicable | Will be |
| **5.2.2.2 Vapour treatment** | | |
| **BAT 60.**<br>BAT is to apply vapour balancing or treatment on significant emissions from the loading and unloading of volatile substances to (or from) trucks, barges and ships. The significance of the emission depends on the substance and the volume that is emitted, and has to be decided on a case-by-case basis. For more detail see Section 4.2.8. | Not Applicable, as the volume of volatile substances stored on site is small. | |
| **5.2.2.3 Valves** | | |
| **BAT 61**.<br>BAT for valves include:<br>• correct selection of the packing material and construction for the process application<br>• with monitoring, focus on those valves most at risk (such as rising stem control valves in continual operation)<br>• applying rotating control valves or variable speed pumps instead of rising stem control valves<br>• where toxic, carcinogenic or other hazardous substances are involved, fit diaphragm, bellows, or double walled valves<br>• route relief valves back into the transfer or storage system or to a vapour treatment system. | Applicable | Will be |

| 5.2.2.4 Pumps and compressors | | |
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| **BAT 62.**<br>The following are some of the main factors which constitute BAT:<br>• proper fixing of the pump or compressor unit to its base-plate or frame<br>• having connecting pipe forces within producers' recommendations<br>• proper design of suction pipework to minimise hydraulic imbalance<br>• alignment of shaft and casing within producers' recommendations<br>• alignment of driver/pump or compressor coupling within producers' recommendations when fitted<br>• correct level of balance of rotating parts<br>• effective priming of pumps and compressors prior to start-up<br>• operation of the pump and compressor within producers' recommended performance range (The optimum performance is achieved at its best efficiency point.)<br>• the level of net positive suction head available should always be in excess of the pump or compressor<br>• regular monitoring and maintenance of both rotating equipment and seal systems, combined with a repair or replacement programme. | Applicable | Will be |
| **BAT 63.**<br>BAT is to use the correct selection of pump and seal types for the process application, preferably pumps that are technologically designed to be tight such as canned motor pumps, magnetically coupled pumps, pumps with multiple mechanical seals and a quench or buffer system, pumps with multiple mechanical seals and seals dry to the atmosphere, diaphragm pumps or bellow pumps. For more details see Sections 3.2.2.2, 3.2.4.1 and 4.2.9. | Applicable | Will be |
| **BAT 64.**<br>BAT for compressors transferring non-toxic gases is to apply gas lubricated mechanical seals. | Not appliable | Will be |
| **BAT 65.**<br>BAT for compressors, transferring toxic gases is to apply double seals with a liquid or gas barrier and to purge the process side of the containment seal with an inert buffer gas. | Not Applicable | Yes |

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| **BAT 66.**<br>In very high pressure services, BAT is to apply a triple tandem seal system. | Not Applicable. No very high pressure services at the site. | |
| **5.2.2.5 Sampling connections** | | |
| **BAT 67.**<br>BAT, for sample points for volatile products, is to apply a ram type sampling valve or a needle valve and a block valve. Where sampling lines require purging, BAT is to apply closed-loop sampling lines. See Section 4.2.9.14. | Not Applicable. No requirement to sample volatile products at the site. | |
| **5.3 Storage of solids**<br>**5.3.1 Open storage** | | |
| **BAT 68.**<br>BAT is to apply enclosed storage by using, for example, silos, bunkers, hoppers and containers, to eliminate the influence of wind and to prevent the formation of dust by wind as far as possible by primary measures. See Table 4.12 for these primary measures with cross-references to the relevant sections. | Applicable | Yes |
| **BAT 69.**<br>BAT for open storage is to carry out regular or continuous visual inspections to see if dust emissions occur and to check if preventive measures are in good working order. Following the weather forecast by, e.g, using meteorological instruments on site, will help to identify when the moistening of heaps is necessary and will prevent unnecessary use of resources for moistening the open storage. See Section 4.3.3.1. | Applicable | Yes |
| **BAT 70.**<br>BAT for long-term open storage are one, or a proper combination, of the following techniques:<br>• moistening the surface using durable dust-binding substances, see Section 4.3.6.1<br>• covering the surface, e.g. with tarpaulins, see Section 4.3.4.4<br>• solidification of the surface, see Table 4.13<br>• grassing-over of the surface, see Table 4.13. | Applicable | Yes |
| **BAT 71.**<br>BAT for short-term open storage are one, or a proper combination, of the following techniques:<br>• moistening the surface using durable dust-binding substances, see Section 4.3.6.1 | Applicable | Yes |

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| • moistening the surface with water, see Sections 4.3.6.1<br>• covering the surface, e.g. with tarpaulins, see Section 4.3.4.4. | | |
| **5.3.2 Enclosed storage** | | |
| **BAT 72.**<br>BAT is to apply enclosed storage by using, for example, silos, bunkers, hoppers and containers. Where silos are not applicable, storage in sheds can be an alternative. This is, e.g. the case if apart from storage, the mixing of batches is needed. | Applicable. | Yes. |
| **BAT 73.**<br>BAT for silos is to apply a proper design to provide stability and prevent the silo from collapsing. See Sections 4.3.4.1 and 4.3.4.5. | Applicable. | Will be |
| **BAT 74.**<br>BAT for sheds is to apply proper designed ventilation and filtering systems and to keep the doors closed. See Section 4.3.4.2. | Applicable. | Yes. |
| **BAT 75**<br>BAT is to apply dust abatement and a BAT associated emission level of 1 – 10 mg/m$^3$, depending on the nature/type of substance stored. The type of abatement technique has to be decided on a case-by-case basis. See Section 4.3.7. | Applicable | Will be |
| **BAT 76**.<br>For a silo containing organic solids, BAT is to apply an explosion resistant silo (see Section 4.3.8.3), equipped with a relief valve that closes rapidly after the explosion to prevent oxygen entering the silo, as described in Section 4.3.8.4. | Not applicable | |
| **5.3.4 Preventing incidents and (major) accidents** | | |
| **BAT 77.**<br>BAT in preventing incidents and accidents is applying a safety management system as described in Section 4.1.7.1. | Applicable. | Yes. |
| **5.4 Transfer and handling of solids**<br>**5.4.1 General approaches to minimise dust from transfer and handling** | | |
| **BAT 78.**<br>BAT is to prevent dust dispersion due to loading and unloading activities in the open air, by scheduling the transfer as much as possible when the wind speed is low. | Applicable | Yes |

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| However, and taking into account the local situation, this type of measure cannot be generalised to the whole EU and to any situation irrespective of the possible high costs. See Section 4.4.3.1. | | |
| **BAT 79.**<br>When applying a mechanical shovel, BAT is to reduce the drop height and to choose the best position during discharging into a truck; see Section 4.4.3.4. | Applicable. | Yes. |
| **BAT 80.**<br>BAT then is to adjust the speed of vehicles on-site to avoid or minimise dust being swirled up; see Section 4.4.3.5.2. | Applicable. | Yes. |
| **BAT 81.**<br>BAT for roads that are used by trucks and cars only, is applying hard surfaces to the roads of, for example, concrete or asphalt, because these can be cleaned easily to avoid dust being swirled up by vehicles, see Section 4.4.3.5.3. However, applying hard surfaces to the roads is not justified when the roads are used just for big shovel vehicles or when a road is temporary. | Applicable. | Yes. |
| **BAT 82.**<br>BAT is to clean roads that are fitted with hard surfaces according to Section 4.4.6.12. | Applicable. | Yes. |
| **BAT 83.**<br>Cleaning of vehicle tyres is BAT. The frequency of cleaning and type of cleaning facility applied (see Section 4.4.6.13) has to be decided on a case-by-case basis. | Applicable. | Yes. |
| **BAT 84.**<br>Where it neither compromises product quality, plant safety, nor water resources, BAT for loading/unloading drift sensitive, wettable products is to moisten the product as described in Sections 4.4.6.8, 4.4.6.9 and 4.3.6.1. Risk of freezing of the product, risk of slippery situations because of ice forming or wet product on the road and shortage of water are examples when this BAT might not be applicable. | Not Applicable- | |
| **BAT 85.**<br>For loading/unloading activities, BAT is to minimise the speed of descent and the free fall height of the product; see Sections 4.4.5.6 and 4.4.5.7 respectively. Minimising the speed of descent can be achieved by the following techniques that are BAT:<br>• installing baffles inside fill pipes<br>• applying a loading head at the end of the pipe or tube to regulate the output speed<br>• applying a cascade (e.g. cascade tube or hopper) | Applicable- | Will be |

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| • applying a minimum slope angle with, e.g. chutes. | | |
| **BAT 86.**<br>To minimise the free fall height of the product, the outlet of the discharger should reach down onto the bottom of the cargo space or onto the material already piled up. Loading techniques that can achieve this, and that are BAT, are:<br>• height adjustable fill pipes<br>• height adjustable fill tubes, and<br>• height adjustable cascade tubes.<br>These techniques are BAT, except when loading/unloading non drift sensitive products, for which the free fall height is not that critical. | Applicable | Will be |
| **5.4.2 Considerations on transfer techniques** | | |
| **BAT 87.**<br>For applying a grab, BAT is to follow the decision diagram as shown in Section 4.4.3.2 and to leave the grab in the hopper for a sufficient time after the material discharge. | Not Applicable | |
| **BAT 88.**<br>BAT for new grabs, is to apply grabs with the following properties (see Section 4.4.5.1):<br>• geometric shape and optimal load capacity<br>• the grab volume is always higher than the volume that is given by the grab curve<br>• the surface is smooth to avoid material adhering, and<br>• a good closure capacity during permanent operation. | Not Applicable | |
| **BAT 89.**<br>For all types of substances, BAT is to design conveyor to conveyor transfer chutes in such a way that spillage is reduced to a minimum. A modelling process is available to generate detail designs for new and existing transfer points. For more details see Section 4.4.5.5. | Not Applicable | |
| **BAT 90.**<br>For non or very slightly drift sensitive products (S5) and moderately drift sensitive, wettable products (S4), BAT is to apply an open belt conveyor and additionally, depending on the local circumstances, one or a proper combination of the following techniques:<br>• lateral wind protection, see Section 4.4.6.1<br>• spraying water and jet spraying at the transfer points, see Sections 4.4.6.8 and | Not Applicable | |

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| 4.4.6.9, and/or<br>• belt cleaning, see Section 4.4.6.10. | | |
| **BAT 91.**<br>For highly drift sensitive products (S1 and S2) and moderately drift sensitive, not wettable products (S3) BAT for new situations, is to:<br>apply closed conveyors, or types where the belt itself or a second belt locks the material (see Section 4.4.5.2), such as:<br>• pneumatic conveyors<br>• trough chain conveyors<br>• screw conveyors<br>• tube belt conveyor<br>• loop belt conveyor<br>• double belt conveyor<br>or to apply enclosed conveyor belts without support pulleys (see Section 4.4.5.3), such as:<br>• aerobelt conveyor<br>• low friction conveyor<br>• conveyor with diabolos.<br>The type of conveyor depends on the substance to be transported and on the location and has to be decided on a case-by-case basis. | Not Applicable | |
| **BAT 92.**<br>For existing conventional conveyors, transporting highly drift sensitive products (S1 and S2) and moderately drift sensitive, not wettable products (S3), BAT is to apply housing; see Section 4.4.6.2. When applying an extraction system, BAT is to filter the outgoing air stream; see Section 4.4.6.4. | Not Applicable | |
| **BAT 93.**<br>To reduce energy consumption for conveyor belts (see Section 4.4.5.2), BAT is to apply:<br>• a good conveyor design, including idlers and idler spacing<br>• an accurate installation tolerance, and<br>• a belt with low rolling resistance. | Not applicable | |