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 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(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.

Dublin Waste to Energy (the Facility) assessment of compliance - 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

Dublin Waste to Energy Ltd (hereafter referred to as DWtE) (Licence Register number W0232-01), are applying to the EPA for an increase in the permitted maximum annual quantity of waste that can be accepted at the DWtE facility from 600,000 tonnes per year to 690,000 tonnes per year (an increase of 15%). DWtE do not store many materials in bulk. Those that are stored in bulk comprise Sulphur Free Gas Oil, Ammonia Solution, Sodium Hydroxide, Sodium Hypochlorite, activated carbon, hydrated lime and residues from the combustion process. All material storage takes place within the main site building.

Conclusions on BAT	Applicability Assessment (describe how the technique applies or not to your installation)	State whether it is in place or state schedule for implementation
5.1 Storage of liquids and Liquefied gases 5.1.1.1 General principles to prevent and reduce emissions		
BAT 1. BAT for a proper design is to take into account at least the following: • the physico-chemical properties of the substance being stored • how the storage is operated, what level of instrumentation is needed, how many operators are required, and what their workload will be • how the operators are informed of deviations from normal process conditions (alarms) • how the storage is protected against deviations from normal	Applicable The storage and handling of process materials at DWtE is undertaken in accordance with the EPA Guidance Document IPC Guidance Note on Storage and Transfer of Materials for Scheduled Activities, EPA 2004. In addition to this, for flammable liquids, the installation and commissioning activities were compliant with the ATEX 137 Directive (Directive 1999/92/EC) and the Chemical Agents Directive (Directive 98/24/EC). Sulphur free diesel gas oil, ammonia solution, sodium hydroxide and sodium hypochlorite are four liquids stored onsite at large	Yes

Conclusions on BAT	Applicability Assessment (describe how the technique applies or not to your installation)	State whether it is in place or state schedule for implementation
process conditions (safety instructions, interlock systems, pressure relief devices, leak detection and containment, etc.) • what equipment has to be installed, largely taking account of past experiences of the product (construction materials, valve quality, etc.) • which maintenance and inspection plan needs to be implemented and how to ease the maintenance and inspection work (access, layout, etc.) • 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.).	quantities. Other liquids such as lubrications oils, hydraulic oils and greases are stored mainly in drums and at a smaller volume (<200l). All bulk tank and storage areas are located within the main building. The sulphur free diesel gas oil tank is bunded. Any liquid captured by bunds can be collected and recovered by appropriate contractor for treatment. Bunded structures are integrity tested on a five-year cycle and the results provided to the EPA. A validation of the Construction Quality Assurance process for the construction of the DWtE facility was undertaken in January 2017. During this validation process on-site bunds were hydrostatically tested and test results confirm that the bunds have been designed and constructed in accordance with the relevant standards and are fit for -use. The ammonia solution tank is double skinned providing secondary containment and fitted with leak detection systems which alarms to the site control room. The sodium hydroxide tank is double skinned providing secondary containment and fitted with leak detection systems which alarms to the site control room. The sodium hypochlorite tank is double skinned providing secondary containment and fitted with leak detection systems which alarms to the site control room.	

Conclusions on BAT	Applicability Assessment (describe how the technique applies or not to your installation)	State whether it is in place or state schedule for implementation
	The DWtE facility has in place a number of systems to prevent emergency situations arising and to minimise their consequence as outlined in Attachment 9-1 of this IE Licence review application. These systems comprise management systems, procedures and plant and equipment designed to prevent operational failures and accidents and to respond in the event of an incident. Storage tanks, delivery systems, supply pipework and dosing pumps (where used) have all been placed on a rigorous preventative maintenance system. There is an Emergency Response procedure which contains a spill procedure which all operational staff are trained on. DWTE work closely with the Dublin Fire Brigade who carry out frequent on-site Emergency Response Training. Spill kits are located at strategic points around the site in order to ensure a quick response to any spillages which occur. There are two 10,000 L Class 1 hydrocarbon interceptors on the surface water drainage system up gradient of the site 725 m^3 underground attenuation tank. A storm water drainage network serving roofs, roads and parking areas conveys rainwater run-off by gravity from these areas to the attenuation tank. This water is used where possible in the process water, in the bottom ash extraction system and the flue gas cleaning system DWtE is connected to the neighbouring Ringsend Municipal Wastewater	

Conclusions on BAT	Applicability Assessment (describe how the technique applies or not to your installation)	State whether it is in place or state schedule for implementation
	Treatment Plant (MWwTP) for discharge of sanitary effluent. Any overflow from the surface water attenuation tank also discharges to the MWwTP if required via manually operated pumps. If the overflow cannot go to the MWwTP it is sent off site for appropriate waste water treatment.	
BAT 2. 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 A preventative maintenance management system is in place across the site which co-ordinates plant and equipment inspections on a predetermined schedule.	Yes
BAT3. 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.	Applicable All storage tanks are aboveground except the Sulphur free gas oil tank. This tank is located below ground level in a concrete bund arrangement.	Yes
BAT 4. 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 and 4.1.3.7 respectively.	Not applicable All tanks are housed within the main building.	Not applicable
BAT 5. BAT is to abate emissions from tank storage, transfer and handling that have a significant negative environmental effect,	Applicable The DWtE uses following techniques to minimise fugitive	Yes

Conclusions on BAT	Applicability Assessment (describe how the technique applies or not to your installation)	State whether it is in place or state schedule for implementation
as described in Section 4.1.3.1	emissions: • All operations take place within the confines of the main building which is kept under constant negative pressure to minimise fugitive emissions to the surrounding environs. • Dust curtains are provided at each of the dischargers onto the conveyor and at the end of the conveyors into the incinerator bottom ash (IBA) bunker. • IBA is stored in a separate IBA bunker with sealed surfaces. The IBA bunker is constructed of reinforced waterproof concrete. • Roof vents provide a natural draft releasing warmed air entering from openings at the lower elevation of the IBA loading area. The IBA bunker is also under negative pressure. • Air Pollution Control Residues (APCR) are collected in hoppers and continuously discharged via an enclosed pneumatic system. The APCR is stored in two silos. The silos are equipped with High Efficiency Particulate Abatement (HEPA) filters to prevent fugitive emissions of flue gas cleaning residues. • Loading of the APCR into containers is via an “elephant’s trunk” and is a closed sealed system. • IBA passes through a wet bath at the bottom of the IBA discharger. The IBA then becomes a moist product that prevents any significant dust. • IBA is removed from DWtE in covered vehicles. APCR is taken off site in sealed containers. Boiler ash is	

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	transported off-site also in sealed containers. • Consumables are delivered to site in bulk or by road tanker and stored designated areas within the main building. Loading /unloading operations are carried out in accordance with documented SOP's.	
BAT 6. On sites where significant VOC emissions are to be expected, BAT includes calculating the VOC emissions regularly.	Not applicable	Not applicable
BAT 7. BAT is to apply dedicated systems; see Section 4.1.4.4.	Applicable All storage containers are dedicated to one material and have been designed to be compatible with the material being stored.	Yes
5.1.1.2 Tank specific considerations		
Open top tanks BAT 8. If emissions to air occur, BAT is to cover the tank by applying: • a floating cover, see Section 4.1.3.2 • a flexible or tent cover, see Section 4.1.3.3, or • a rigid cover, see Section 4.1.3.4. 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	Not applicable	Not applicable

Conclusions on BAT	Applicability Assessment (describe how the technique applies or not to your installation)	State whether it is in place or state schedule for implementation
basis.		
BAT 9. 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	Not applicable
External floating roof tank BAT 10. 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	Not applicable
BAT 11. 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	Not applicable
BAT 12. For liquids containing a high level of particles (e.g. crude oil), BAT is to mix the stored substance to prevent deposition that	Not applicable	Not applicable

Conclusions on BAT	Applicability Assessment (describe how the technique applies or not to your installation)	State whether it is in place or state schedule for implementation
would call for an additional cleaning step, see Section 4.1.5.1.		
Fixed roof tanks BAT 13. 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	Not applicable
BAT 14. 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	Not applicable
BAT 15. 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	Not applicable
BAT 16. 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	Not applicable
Atmospheric horizontal tanks BAT 17. For the storage of volatile substances which are toxic (T), very	Not applicable	Not applicable

Conclusions on BAT	Applicability Assessment (describe how the technique applies or not to your installation)	State whether it is in place or state schedule for implementation
toxic (T+), or CMR categories 1 and 2 in an atmospheric horizontal tank, BAT is to apply a vapour treatment installation.		
BAT 18. For other substances, BAT is to do all, or a combination, of the following techniques, depending on the substances stored: • apply pressure vacuum relief valves; see Section 4.1.3.11 • up rate to 56 mbar; see Section 4.1.3.11 • apply vapour balancing; see Section 4.1.3.13 • apply a vapour holding tank, see Section 4.1.3.14, or • apply vapour treatment; see Section 4.1.3.15. The selection of the vapour treatment technology has to be decided on a case-by-case basis.	Not applicable	Not applicable
Pressurised storage BAT 19. 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	Not applicable
Lifter roof tanks BAT 20. For emissions to air, BAT is to (see Sections 3.1.9 and 4.1.3.14): • apply a flexible diaphragm tank equipped with pressure/vacuum relief valves, or	Not applicable	Not applicable

Conclusions on BAT	Applicability Assessment (describe how the technique applies or not to your installation)	State whether it is in place or state schedule for implementation
• apply a lifter roof tank equipped with pressure/vacuum relief valves and connected to a vapour treatment installation. The selection of the vapour treatment technology has to be decided on a case-by-case basis.		
Underground and mounded tanks BAT 21. 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	Not applicable
BAT 22. For other substances, BAT is to do all, or a combination, of the following techniques, depending on the substances stored: • apply pressure vacuum relief valves; see Section 4.1.3.11 • apply vapour balancing; see Section 4.1.3.13 • apply a vapour holding tank, see Section 4.1.3.14, or • apply vapour treatment; see Section 4.1.3.15. The selection of the vapour treatment technology has to be decided on a case-by-case basis.	Not applicable While the sulphur free diesel oil tank is below ground level it is not classified as an underground storage tank.	Not applicable
5.1.1.3 Preventing incidents and (major) accidents		
BAT 23. BAT in preventing incidents and accidents is to apply a safety management system as described in Section 4.1.6.1.	Applicable In accordance with Condition 9.1 and 9.2 of the site IE Licence an Environmental Accident Prevention Policy and Emergency	Yes

Conclusions on BAT	Applicability Assessment (describe how the technique applies or not to your installation)	State whether it is in place or state schedule for implementation
	Response Plan are in place at the DWtE site. These are reviewed at least annually and comply with the safety management system as outlined in 4.1.6.1 and in particular: (i) Plant, processes and materials have been examined, and areas that may give rise to safety or environmental emergencies have been identified. (ii) The Director of Operations holds overall responsibility for the facility during normal operations and in an emergency. The Director of Operations is also responsible for the state-of-readiness of the plant, emergency equipment and for ensuring required training is conducted. For an emergency event that occurs during normal business hours the Director of Operations or his designee will act as the Emergency Coordinator (EC) and is responsible and shall be in charge of the situation. There is sufficient trained staff on-site at all times to manage emergencies.	
BAT 24. 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 All staff are qualified and appropriately trained for the tasks that they conduct on site. A comprehensive training programme is in place at the DWtE site and includes training for staff in Emergency Response, Spill Response and Incident Investigation. Training records are maintained.	Yes
BAT 25. BAT is to prevent corrosion by:	Applicable	Yes

Conclusions on BAT	Applicability Assessment (describe how the technique applies or not to your installation)	State whether it is in place or state schedule for implementation
• selecting construction material that is resistant to the product stored • applying proper construction methods • preventing rainwater or groundwater entering the tank and if necessary, removing water that has accumulated in the tank • applying rainwater management to bund drainage • applying preventive maintenance, and • where applicable, adding corrosion inhibitors, or applying cathodic protection on the inside of the tank.	All tanks/ containers have been designed to be resistant to the material being stored. Tanks are subject to regular planned integrity testing. Furthermore regular maintenance as required is carried out to prevent corrosion.	
BAT 26. Additionally for an underground tank, BAT is to apply to the outside of the tank: • a corrosion-resistant coating • plating, and/or • a cathodic protection system.	Not Applicable	Not Applicable
BAT 27. BAT is to prevent stress corrosion cracking (SCC) by: • stress relieving by post-weld heat treatment, see Section 4.1.6.1.4, and • applying a risk based inspection as described in Section 4.1.2.2.1.	Applicable DWtE has a risk based procedure to ensure the integrity of on-site storage tanks is maintained. The procedure follows the principles of the EPA Guidance on Storage and Transfer of Materials.	Yes
BAT 28. 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:	Applicable Standard operating procedures are in place for operations at the DWtE facility including tank filling operations.	Yes

Conclusions on BAT	Applicability Assessment (describe how the technique applies or not to your installation)	State whether it is in place or state schedule for implementation
• high level or high pressure instrumentation with alarm settings and/or auto closing of valves is installed • proper operating instructions are applied to prevent overfill during a tank filling operation, and • sufficient ullage is available to receive a batch filling.	Leak detection alarms have been installed where required. There is an Environmental Management System in place on site assuring continual improvement in environmental performance. The diesel oil tanker off-loading area is contained. The site has two Class I Oil Interceptors which are routinely maintained.	
BAT 29. BAT is to apply leak detection on storage tanks containing liquids that can potentially cause soil pollution.	Applicable Ammonia solution, sodium hydroxide and sodium hypochlorite are stored in double lined tanks with leak detection systems which alarm in the control room.	Yes
BAT 30. 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.	Applicable Bunding of storage tanks and routine bund and tank inspections prevent soil pollution from storage of materials.	Yes
BAT 31. 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: • tank bunds around single wall tanks; see Section 4.1.6.1.11 • double wall tanks; see Section 4.1.6.1.13 • cup-tanks; see Section 4.1.6.1.14 • double wall tanks with monitored bottom discharge; see Section 4.1.6.1.15.	Applicable Such tanks are bunded. Both the tanks and bunds are subject to routine integrity tests.	Yes

Conclusions on BAT	Applicability Assessment (describe how the technique applies or not to your installation)	State whether it is in place or state schedule for implementation
BAT 32. 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	Not applicable
BAT 33. 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.	Applicable Tanks on site are either bunded or double skinned providing secondary containment. In the event of a loss of containment and/or bund failure, the isolated main process building drainage system will act as local tertiary containment.	Yes
BAT 34. 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	Not applicable
BAT 35. BAT for underground and mounded tanks containing products that can potentially cause soil pollution is to: • apply a double walled tank with leak detection, see Section 4.1.6.1.16, or • to apply a single walled tank with secondary containment	Not applicable	Not applicable

Conclusions on BAT	Applicability Assessment (describe how the technique applies or not to your installation)	State whether it is in place or state schedule for implementation
and leak detection, see Section 4.1.6.1.17.		
BAT 36. For toxic, carcinogenic or other hazardous substances, BAT is to apply full containment.	Applicable Storage tanks at DWtE are either double skinned or bunded .	Yes
5.1.2. Storage of packaged dangerous substances		
BAT 37. BAT in preventing incidents and accidents is to apply a safety management system as described in Sections 4.1.6.1. 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	Not Applicable	Not Applicable
BAT 38. BAT is to appoint a person or persons who is or are responsible for the operation of the store.	Not Applicable	Not Applicable
BAT 39. 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.	Not Applicable	Not Applicable

Conclusions on BAT	Applicability Assessment (describe how the technique applies or not to your installation)	State whether it is in place or state schedule for implementation
BAT 40. 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.	Not Applicable	Not Applicable
BAT 41. 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.	Not Applicable	Not Applicable
BAT 42. BAT is to separate and/or segregate incompatible substances. For the compatible and incompatible combinations see Annex 8.3.	Not Applicable	Not Applicable
BAT 43. 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.	Not Applicable	Not Applicable

Conclusions on BAT	Applicability Assessment (describe how the technique applies or not to your installation)	State whether it is in place or state schedule for implementation
BAT 44. 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.	Not Applicable	Not Applicable
BAT 45. 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.	Not Applicable	Not Applicable
BAT 46. BAT is to prevent ignition at source as described in Section 4.1.7.6.1.	Not Applicable	Not Applicable
5.1.3 Basins and lagoons		
BAT 47. 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: • a plastic cover; see Section 4.1.8.2 • a floating cover; see Section 4.1.8.1, or • only small basins, a rigid cover; see Section 4.1.8.2. Additionally, where a rigid cover is used, a vapour treatment	Not Applicable	Not Applicable

Conclusions on BAT	Applicability Assessment (describe how the technique applies or not to your installation)	State whether it is in place or state schedule for implementation
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.		
BAT 48. 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	Not Applicable
BAT 49. 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	Not Applicable
5.2 Transfer and handling of liquids and liquefied gases 5.2.1 General principles to prevent and reduce emissions		
BAT 50. 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 DWtE has a dedicated maintenance programme with specific SOPs on inspection and preventative maintenance. Training is provided to relevant personnel.	Yes
BAT 51. For large storage facilities, according to the properties of the	Applicable	Yes

Conclusions on BAT	Applicability Assessment (describe how the technique applies or not to your installation)	State whether it is in place or state schedule for implementation
products stored, BAT is to apply a leak detection and repair programme. Focus needs to be on those situations most likely to cause emissions (such as gas/light liquid, under high pressure and/or temperature duties). See Section 4.2.1.3.	DWtE has a programme in place to routinely check tanks and aboveground/underground pipelines for leaks and to undertake repairs where required.	
BAT 52. 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 Refer to Bat 5	Yes
BAT 53. BAT in preventing incidents and accidents is to apply a safety management system as described in Section 4.1.6.1.	Applicable Refer to Bat 1	Yes
BAT 54. 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 Refer to Bat 24	Yes
5.2.2 Considerations on transfer and handling techniques 5.2.2.1 Piping		
BAT 55. 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	Applicable Pipelines are located above ground within contained areas. A risk and reliability based maintenance approach is adopted at the	Yes

Conclusions on BAT	Applicability Assessment (describe how the technique applies or not to your installation)	State whether it is in place or state schedule for implementation
described in Section 4.1.2.2.1.	DWTE facility.	
BAT 56. 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 Welded connections are used on piping where possible.	Yes
BAT 57. BAT for bolted flange connections (see Section 4.2.2.2.) include: • fitting blind flanges to infrequently used fittings to prevent accidental opening • using end caps or plugs on open-ended lines and not valves • ensuring gaskets are selected appropriate to the process application • ensuring the gasket is installed correctly • ensuring the flange joint is assembled and loaded correctly • where toxic, carcinogenic or other hazardous substances are transferred, fitting high integrity gaskets, such as spiral wound, kammprofile or ring joints.	Applicable Flanges and gasket have been selected in accordance with appropriate standards and codes of practice and based on the materials handled.	Yes
BAT 58. BAT is to prevent corrosion by: • selecting construction material that is resistant to the product • applying proper construction methods • applying preventive maintenance, and	Applicable Pipes have been designed to be resistant to the material being transferred. Preventative maintenance minimises corrosion	Yes

Conclusions on BAT	Applicability Assessment (describe how the technique applies or not to your installation)	State whether it is in place or state schedule for implementation
• where applicable, applying an internal coating or adding corrosion inhibitors.		
BAT 59. 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 Sea water cooling pipework has been especially chosen given the proximity of DWtE to the sea. This pipework is Glass Reinforced pipework.	Yes
5.2.2.2 Vapour treatment		
BAT 60. 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.	Not applicable
5.2.2.3 Valves		
BAT 61. BAT for valves include: • correct selection of the packing material and construction for the process application • with monitoring, focus on those valves most at risk (such as rising stem control valves in continual operation) • applying rotating control valves or variable speed pumps instead of rising stem control valves	Applicable Valves have been selected in accordance with appropriate standards and codes of practice and based on the materials handled.	Yes

Conclusions on BAT	Applicability Assessment (describe how the technique applies or not to your installation)	State whether it is in place or state schedule for implementation
• where toxic, carcinogenic or other hazardous substances are involved, fit diaphragm, bellows, or double walled valves • route relief valves back into the transfer or storage system or to a vapour treatment system.		
5.2.2.4 Pumps and compressors		
BAT 62. The following are some of the main factors which constitute BAT: • proper fixing of the pump or compressor unit to its base-plate or frame • having connecting pipe forces within producers' recommendations • proper design of suction pipework to minimise hydraulic imbalance • alignment of shaft and casing within producers' recommendations • alignment of driver/pump or compressor coupling within producers' recommendations when fitted • correct level of balance of rotating parts • effective priming of pumps and compressors prior to start-up • operation of the pump and compressor within producers' recommended performance range (The optimum performance is achieved at its best efficiency point.) • the level of net positive suction head available should always be in excess of the pump or compressor • regular monitoring and maintenance of both rotating	Applicable All pumps are fit for purpose and have been considered in the relevant process HAZOPs. Pumps have installed by a qualified contractor and have been commissioned and tested. Pumps are on a preventive maintenance schedule.	Yes

Conclusions on BAT	Applicability Assessment (describe how the technique applies or not to your installation)	State whether it is in place or state schedule for implementation
equipment and seal systems, combined with a repair or replacement programme.		
BAT 63. 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 Pumps have been selected to meet process requirements. They are on a preventative maintenance schedule which reduces the likelihood of leaks.	Yes
BAT 64. BAT for compressors transferring non-toxic gases is to apply gas lubricated mechanical seals.	Not Applicable	Not Applicable
BAT 65. 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	Not applicable
BAT 66. In very high pressure services, BAT is to apply a triple tandem seal system.	Not applicable	Not applicable
5.2.2.5 Sampling connections		

Conclusions on BAT	Applicability Assessment (describe how the technique applies or not to your installation)	State whether it is in place or state schedule for implementation
BAT 67. 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	Not Applicable
5.3 Storage of solids 5.3.1 Open storage		
BAT 68. 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.	Not Applicable	Not Applicable
BAT 69. 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.	Not applicable	Not applicable
BAT 70. BAT for long-term open storage are one, or a proper	Not applicable	Not applicable

Conclusions on BAT	Applicability Assessment (describe how the technique applies or not to your installation)	State whether it is in place or state schedule for implementation
combination, of the following techniques: • moistening the surface using durable dust-binding substances, see Section 4.3.6.1 • covering the surface, e.g. with tarpaulins, see Section 4.3.4.4 • solidification of the surface, see Table 4.13 • grassing-over of the surface, see Table 4.13.		
BAT 71. BAT for short-term open storage are one, or a proper combination, of the following techniques: • moistening the surface using durable dust-binding substances, see Section 4.3.6.1 • moistening the surface with water, see Sections 4.3.6.1 • covering the surface, e.g. with tarpaulins, see Section 4.3.4.4.	Not applicable	Not applicable
5.3.2 Enclosed storage		
BAT 72. 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 See BAT 5	Yes
BAT 73. 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. Silos have been appropriately designed to provide stability and prevent collapsing.	Yes

Conclusions on BAT	Applicability Assessment (describe how the technique applies or not to your installation)	State whether it is in place or state schedule for implementation
BAT 74. BAT for sheds is to apply proper designed ventilation and filtering systems and to keep the doors closed. See Section 4.3.4.2.	Not Applicable	Not Applicable
BAT 75 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 See BAT 5. As a result of the measures in BAT 5 an ELV for dust from storage is not required.	Yes
BAT 76. 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	Not Applicable
5.3.4 Preventing incidents and (major) accidents		
BAT 77. BAT in preventing incidents and accidents is applying a safety management system as described in Section 4.1.7.1.	Applicable See BAT 1 and BAT 23	Yes
5.4 Transfer and handling of solids 5.4.1 General approaches to minimise dust		

Conclusions on BAT	Applicability Assessment (describe how the technique applies or not to your installation)	State whether it is in place or state schedule for implementation
from transfer and handling		
BAT 78. 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. 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.	Not applicable Loading and unloading activities are carried out in the enclosed main building.	Not applicable
BAT 79. 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.	Not applicable	Not applicable
BAT 80. 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 The facility road network is constructed of hardstanding tarmacadam thereby minimising the possibility of dust. Speed restriction /signage are in place.	Yes
BAT 81. 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 All roads on site are paved.	Yes

Conclusions on BAT	Applicability Assessment (describe how the technique applies or not to your installation)	State whether it is in place or state schedule for implementation
BAT 82. BAT is to clean roads that are fitted with hard surfaces according to Section 4.4.6.12.	Applicable As per the site EMS road surfaces are cleaned on a routine basis.	Yes
BAT 83. 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.	Not applicable	Not applicable
BAT 84. 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	Not applicable
BAT 85. 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: • installing baffles inside fill pipes • applying a loading head at the end of the pipe or tube to regulate the output speed	Not applicable Loading and unloading activities are carried out in the enclosed main building.	Not applicable

Conclusions on BAT	Applicability Assessment (describe how the technique applies or not to your installation)	State whether it is in place or state schedule for implementation
• applying a cascade (e.g. cascade tube or hopper) • applying a minimum slope angle with, e.g. chutes.		
BAT 86. 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: • height adjustable fill pipes • height adjustable fill tubes, and • height adjustable cascade tubes. These techniques are BAT, except when loading/unloading non drift sensitive products, for which the free fall height is not that critical.	Not applicable Loading and unloading activities are carried out in the enclosed main building.	Not applicable
5.4.2 Considerations on transfer techniques		
BAT 87. 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.	Applicable Waste grabbers on site meet the requirements of BAT 87 and are left in situ for a sufficient time after waste discharge.	Yes
BAT 88. BAT for new grabs, is to apply grabs with the following properties (see Section 4.4.5.1): • geometric shape and optimal load capacity • the grab volume is always higher than the volume that is given by the grab curve	Not Applicable Although the DWtE grabbers are not new they meet the requirements of BAT 88.	Not Applicable

Conclusions on BAT	Applicability Assessment (describe how the technique applies or not to your installation)	State whether it is in place or state schedule for implementation
• the surface is smooth to avoid material adhering, and • a good closure capacity during permanent operation.		
BAT 89. 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.	Applicable See BAT 5	Yes
BAT 90. 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: • lateral wind protection, see Section 4.4.6.1 • spraying water and jet spraying at the transfer points, see Sections 4.4.6.8 and 4.4.6.9, and/or • belt cleaning, see Section 4.4.6.10.	Applicable See BAT 5	Yes
BAT 91. For highly drift sensitive products (S1 and S2) and moderately drift sensitive, not wettable products (S3) BAT for new situations, is to: apply closed conveyors, or types where the belt itself or a second belt locks the material (see Section 4.4.5.2), such as: • pneumatic conveyors • trough chain conveyors	Not applicable No highly drift sensitive products at the site	Not applicable

Conclusions on BAT	Applicability Assessment (describe how the technique applies or not to your installation)	State whether it is in place or state schedule for implementation
• screw conveyors • tube belt conveyor • loop belt conveyor • double belt conveyor or to apply enclosed conveyor belts without support pulleys (see Section 4.4.5.3), such as: • aerobelt conveyor • low friction conveyor • conveyor with diabolos. 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.		
BAT 92. 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 No highly drift sensitive products at the site	Not applicable
BAT 93. To reduce energy consumption for conveyor belts (see Section 4.4.5.2), BAT is to apply: • a good conveyor design, including idlers and idler spacing • an accurate installation tolerance, and • a belt with low rolling resistance.	Applicable Both conveyors used at the DWtE facility have been designed to reduce energy consumption. The Incinerator Bottom Ash conveyor is a vibrating pan and the boiler ash conveyor is a drag chain conveyor. These conveyors incorporate good design and are part of the DWtE preventative maintenance programme.	Yes