Article 46, 47 and 48 IED Requirements

Table 1 below describes how the DWtE facility meets the requirements of Article 46, 47 and 48 of the IED.

Table 1. DWtE IED Article 46, 47 and 48 Compliance

IED Requirements	DWtE Compliance
Article 46 Requirements	
1. Waste gases from waste incineration plants and waste co-incineration plants shall be discharged in a controlled way by means of a stack the height of which is calculated in such a way as to safeguard human health and the environment	The waste gases from the DWTE Facility are discharged in a controlled manner via two stacks, each at height of 100metres above ground, and internal diameter of 2.4metres. The emissions into air do not exceed the emission limit values set out in Part 3 of Annex VI of the Industrial Emissions Directive. Furthermore the emissions are in compliance with DWtE IE Licence Ref. No.: W0232-01 and specifically Schedule B of this licence which specifies the minimum discharge height for each stack. Each boiler has its own independent train of Air Pollution Control (APC) equipment. The system consists of an SNCR system for NOx reduction, a carbon injection system for heavy metal reduction, a semi-dry flue gas scrubber with reagent feed section, a fabric filter baghouse, a flue gas cooler for energy recovery, a two stage wet scrubber, an induced draft fan, a stack, and associated ductwork. 1) Boiler Temperature The waste is combusted at a minimum temperature of 850^{o}C for 2 secs to ensure there are no dioxins formed as a result of the combustion process. 2) Selective Non-Catalytic Reduction System An aqueous ammonia solution is injected at four levels into the flue gas in the radiation zone of the boiler, using compressed air as a carrier medium, to minimize NOx emissions. The system is designed to meet the emission limits for NOx indicated in the IED. 3) Semi-Dry Scrubber Acid gases are neutralized using lime in a semi-dry scrubber reactor. The system utilises hydrated lime as a reagent prepared from quicklime. Activated carbon is also injected for heavy metal control. 4) Filter Bag-house Emissions of particulate matter are controlled primarily through the use of a filter baghouse. This system employs over 5,000 filter bags though which the flue gas must pass. Baghouses, one (1) pulse jet type per boiler unit, contain 12 isolatable modules (arranged in 2 parallel rows), all operating in parallel and each with its own hopper. The number of modules ensure that taking a compartment out for cleaning and having another compartment out for maintenance will

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	not compromise performance. Baghouses have been designed for variations of temperature and pressure due to failure of other components in the system (such as scrubber malfunction, loss of an ID or CA fan or the malfunction of a flue gas damper). 5) Wet-Scrubber Before flue gas finally exits through the stack, water is used in a wet scrubber to reduce temperature and remove any residual HCl. In addition a sodium hydroxide solution is used to remove residual SO_2. The wet scrubber consists of a co-current quenching flow section (Quench stage) and a co-concurrent flow absorption column (Packed bed stage) which is fed via a common sump. Wet scrubber effluent is re-circulated within the scrubber system. Continuous Emission Monitoring and Stack Testing Throughout the air pollution treatment process the emissions are continuously monitored using a real time continuous monitoring system (CEMS). Each stack has its own CEMS and in addition a redundant CEMS is continuously on stand-by in the event of one of the live systems going down. These systems are calibrated weekly and certified on an annual basis. In addition, independent stack testing of the parameters is carried out on a quarterly basis to ensure compliance with the ELVs.
2. Emissions into air from waste incineration plants and waste co-incineration plants shall not exceed the emission limit values set out in Parts 3 and 4 of Annex VI or determined in accordance with Part 4 of that Annex. If in a waste co-incineration plant more than 40 % of the resulting heat release comes from hazardous waste, or the plant co-incinerates untreated mixed municipal waste, the emission limit values set out in Part 3 of Annex VI shall apply.	See response to point 1 above.
3. Discharges to the aquatic environment of waste water resulting from the cleaning of waste gases shall be limited as far as practicable and the concentrations of polluting substances shall not exceed the emission limit values set out in Part 5 of Annex VI.	Not Applicable (N/A). The DWtE facility has been designed to ensure there are no direct discharges of wastewater to the aquatic environment. All process water at the facility (e.g. boiler blow down, boiler water treatment reject water and scrubber water) are collected for recycling in the Flue Gas Treatment system or used for humidification/cooling of the bottom ash outlet. All surface water run-off from building roofs and from roads and car parking areas are collected and stored in a attenuation storage tank for re-use in the process. The facility is connected to the adjacent Municipal WwTP for sanitary emissions. Water is abstracted form the River Liffey and is used to condense the steam from the process. The cooling water is then discharged to the River Liffey as per the requirements of

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	Schedule B.2 of IE Licence W0232-01.
4. The emission limit values shall apply at the point where waste waters from the cleaning of waste gases are discharged from the waste incineration plant or waste co-incineration plant. When waste waters from the cleaning of waste gases are treated outside the waste incineration plant or waste co-incineration plant at a treatment plant intended only for the treatment of this sort of waste water, the emission limit values set out in Part 5 of Annex VI shall be applied at the point where the waste waters leave the treatment plant. Where the waste water from the cleaning of waste gases is treated collectively with other sources of waste water, either on site or off site, the operator shall make the appropriate mass balance calculations, using the results of the measurements set out in point 2 of Part 6 of Annex VI in order to determine the emission levels in the final waste water discharge that can be attributed to the waste water arising from the cleaning of waste gases. Under no circumstances shall dilution of waste water take place for the purpose of complying with the emission limit values set out in Part 5 of Annex VI.	N/A see the response to point 3 above.
5. Waste incineration plant sites and waste co-incineration plant sites, including associated storage areas for waste, shall be designed and operated in such a way as to prevent the unauthorised and accidental release of any polluting substances into soil, surface water and groundwater. Storage capacity shall be provided for contaminated rainwater run-off from the waste incineration plant site or waste co-incineration plant site or for contaminated water arising from spillage or fire-fighting operations. The storage capacity shall be adequate to ensure that such waters can be tested and treated before discharge where necessary.	The DWtE facility has been designed and constructed to ensure there are no unauthorised or accidental release of any polluting substances into soil, groundwater and surface water. All operational areas of the site including site roads are all hard standing of either concrete or tarmacadam make-up. The drainage from the site roads discharge to an underground surface water attenuation storage tank. This water is reused on-site in the process. Furthermore, the waste building has a network of internal drains which allows for the collection of any spillages or floor washings into a concrete pit. This water is reused on-site in the process. The waste bunker has a concrete base with an impermeable membrane between the concrete and the soil to prevent the leakage of any leachate from the bunker into the surrounding environment.
6. Without prejudice to Article 50(4)(c), the waste incineration plant or waste co-incineration plant or individual furnaces being part of a waste incineration plant or waste co-incineration plant shall under no circumstances continue to incinerate waste for a period of more than 4 hours uninterrupted where emission limit values are exceeded. The cumulative duration of operation in such conditions over 1 year shall not exceed 60 hours. The time limit set out in the second subparagraph shall apply to those furnaces which are linked to one single waste gas cleaning device.	The DWtE facility does not carry out combustion of waste for more than 4 hours where the emission limit values are exceeded. The cumulative duration of these exceedances in a 12 month period does not exceed 60 hours per boiler.

Article 47 Requirements

IED Requirements	DWtE Compliance
In the case of a breakdown, the operator shall reduce or close down operations as soon as practicable until normal operations can be restored.	In the event of a breakdown DWTE can reduce or close down operations as soon as practicable until normal operations can be restored. DWtE has in place a specific protocol to follow in the event of such an occurrence. The flow-chart outlined in Figure 1 identifies the protocol that will be followed in the event of abnormal operations or abreakdown The following definitions apply at DWtE: Abnormal operations: Any technical stoppage, disturbance, or failure of the purification devices or the measurement devices, during which the concentration in the discharges to the air may exceed the prescribed emission limit values. Breakdown: Any malfunction or technical stoppage, disturbance or failure of the incineration plant or equipment.
Article 48 Requirements	
1. Member States shall ensure that the monitoring of emissions is carried out in accordance with Parts 6 and 7 of Annex VI	Representative monitoring of the emissions from the facility is carried out in accordance with Parts 6 and 7 of Annex VI of the IED. The sampling and analysis of all parameters including dioxins and furans, in addition to the quality assurance of the automated measuring systems and the reference measurement to calibrate them, is carried out in accordance with CEN-standards.
2. The installation and functioning of the automated measuring systems shall be subject to control and to annual surveillance tests as set out in point 1 of Part 6 of Annex VI.	Air monitoring The following measurements relating to air polluting substances are carried out: 1) Continuous measurements of the following substances: NOx, CO, total dust, TOC, HCl and SO_2; 2) Continuous measurements of temperature near the inner wall of the combustion chamber, concentration of oxygen, pressure, temperature and water vapour content of the waste gas; 3) At least two measurements per year of heavy metals and dioxins and furans. The results of the measurements are standarised using the standard oxygen concentration of 11% at STP and calculated in accordance with the Part 4 and Part 7 of Annex VI of the IED. Water Discharge monitoring The only discharge to water from the DWTE facility is the cooling water discharge. Water is abstracted form the River Liffey continuously and is used to condense the steam from the process. The cooling water and steam do not come into contact. Continuous monitoring of the pH, flow, and temperature is carried out as per part 6 of Annex VI of the IED.
3. The competent authority shall determine the location of the sampling or measurement points to be used for monitoring of emissions.	These are set out in the conditions of IE Licence W0232-01 as granted by the EPA.
4. All monitoring results shall be recorded, processed and	DWtE records, processes and presents monitoring results as

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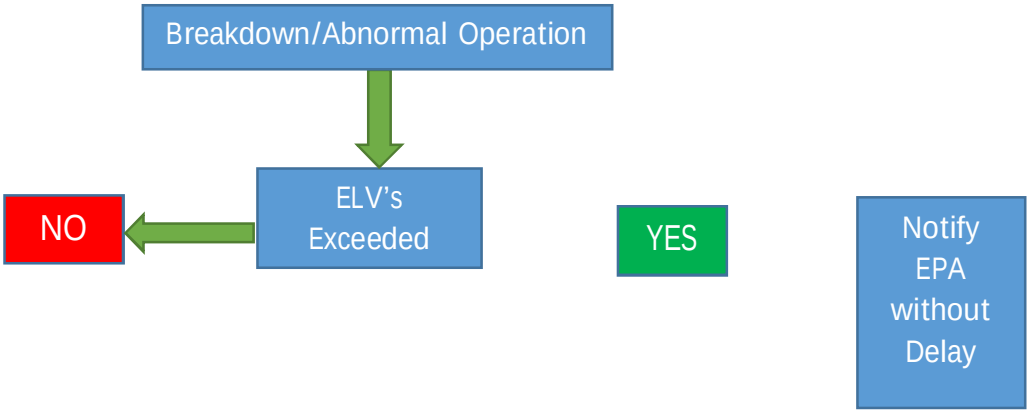
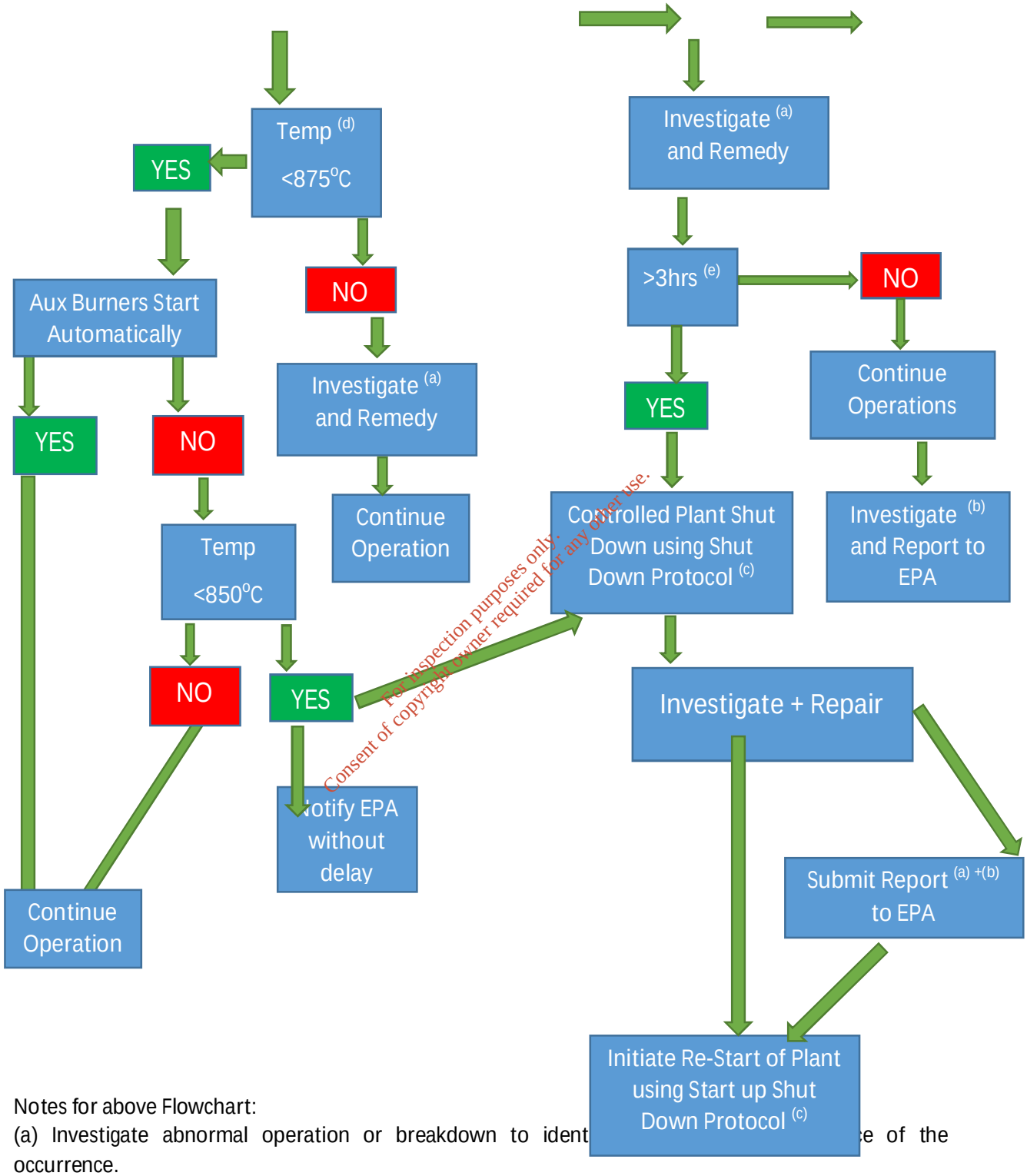
presented in such a way as to enable the competent authority to verify compliance with the operating conditions and emission limit values which are included in the permit.	per the conditions of IE Licence W0232-01 as granted by the EPA.
5. As soon as appropriate measurement techniques are available within the Union, the Commission shall, by means of delegated acts in accordance with Article 76 and subject to the conditions laid down in Articles 77 and 78, set the date from which continuous measurements of emissions into the air of heavy metals and dioxins and furans are to be carried out.	DWtE follows the measurement techniques as set out in IE Licence W0232-01 as granted by the EPA.

FIGURE 1 – Breakdown/Abnormal Operation Protocol Flow Chart





Notes for above Flowchart:

(a) Investigate abnormal operation or breakdown to ident e of the occurrence.

(b) Evaluate any relevant IE License requirements, remediation, mitigation and reporting.

(c) Refer to HZI Document B2.10 Start Up and Shut Down Protocol -50058981-0.2

(d) New logic programme instructs the burners to automatically start when temperature drops below 875°C

(e) Flowchart indicates >3hours, (to increase remediation time) however the IE License states 4 hours.

This protocol is developed in compliance with condition 3.19.1 in the event of abnormal operation/ breakdown and outlines the steps taken to initiate restart of the plant.