European Union Network for the Implementation and Enforcement of Environmental Law

IED Implementation Project

Wastewater treatment plants: how to deal with inspections

Date of report: October 2018

Introduction to IMPEL

The European Union Network for the Implementation and Enforcement of Environmental Law (IMPEL) is an international non-profit association of the environmental authorities of the EU Member States, acceding and candidate countries of the European Union and EEA countries. The association is registered in Belgium and its legal seat is in Brussels, Belgium.

IMPEL was set up in 1992 as an informal Network of European regulators and authorities concerned with the implementation and enforcement of environmental law. The Network's objective is to create the necessary impetus in the European Community to make progress on ensuring a more effective application of environmental legislation. The core of the IMPEL activities concerns awareness raising, capacity building and exchange of information and experiences on implementation, enforcement and international enforcement collaboration as well as promoting and supporting the practicability and enforceability of European environmental legislation.

During the previous years IMPEL has developed into a considerable, widely known organisation, being mentioned in a number of EU legislative and policy documents, e.g. the 7th Environment Action Programme and the Recommendation on Minimum Criteria for Environmental Inspections.

The expertise and experience of the participants within IMPEL make the network uniquely qualified to work on both technical and regulatory aspects of EU environmental legislation.

Information on the IMPEL Network is also available through its website at: www.impel.eu.

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Executive Summary

The present Report is the result of the work of the Subgroup "Wastewater", that is part of the "IED Implementation" project team. It intends to be a first approach to deal with the topic of assessing compliance of wastewater discharging by industrial installations with EU legislation; consequently, it is mainly addressed to inspection Authorities that have to tackle this task.

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1. Executive summary

The present Report provides an overview of the regulatory framework and monitoring requirements of urban and industrial waste water. BATs about wastewater management are illustrated. Indications and practical tools for wastewater inspections are presented (checklist), with a glance to sampling activities too. Results of a survey that was circulated among Member States are summarised (see Annex 2).

2. Definitions[1]

Urban wastewater: Domestic wastewater or the mixture of domestic wastewater with industrial wastewater and/or run-off rain water.

Domestic wastewater: wastewater from residential settlements and services which originates predominantly from the human metabolism and from household activities.

Industrial wastewater: Any wastewater which is discharged from premises used for carrying on any trade or industry, other than domestic wastewater and run-off rain water.

Primary treatment: treatment of urban wastewater by a physical and/or chemical process involving settlement of suspended solids, or other processes in which the BOD_5 of the incoming wastewater is reduced by at least 20% before discharge and the total suspended solids of the incoming wastewater are reduced by at least 50%.

Secondary treatment: treatment of urban wastewater by a process generally involving biological treatment with a secondary settlement or other process in which the requirements established in Table 1 of Annex I of of Council Directive 91/271 are respected.

Appropriate treatment: Treatment of urban wastewater by any process and/or disposal system which after discharge allows the receiving waters to meet the relevant quality objectives and the relevant provisions of Council Directive 91/271 and other Community Directives.

3. Regulatory framework

3.1. Directive 2000/60/EC - Water framework Directive

In 2000, the European Union took a ground-breaking step when it adopted the Water Framework Directive (WFD). It introduces a new legislative approach to managing and protecting water, based not on national or political boundaries but on natural geographical and hydrological formations: river basins. It also requires coordination of different EU policies, and sets out a precise timetable for action, with 2015 as the target date for getting all European waters into good condition.

Waters must achieve good ecological and chemical status, to protect human health, water supply, natural ecosystems and biodiversity.

[1] From Council Directive 91/271/EEC of 21 May 1991 concerning urban wastewater treatment.

The definition of ecological status looks at the abundance of aquatic flora and fish fauna, the availability of nutrients, and aspects like salinity, temperature and pollution by chemical pollutants. Morphological features, such as quantity, water flow, water depths and structures of the river beds, are also taken into account. The WFD classification scheme for surface water ecological status includes five categories: high, good, moderate, poor and bad. 'High status' means no or very low human pressure. 'Good status' means a 'slight' deviation from this condition, 'moderate status' means 'moderate' deviation, and so on.

3.2. Council Directive 91/271/EEC of 21 May 1991 concerning urban waste-water treatment

The Council Directive 91/271/EEC concerning urban waste-water treatment was adopted on 21 May 1991. Its objective is to protect the environment from the adverse effects of urban wastewater discharges and discharges from certain industrial sectors (see Annex III of the Directive) and concerns the collection, treatment and discharge of:

- Domestic wastewater.
- Mixture of wastewater.
- Wastewater from certain industrial sectors (see Annex III of the Directive).

The areas into which urban wastewater entering collecting systems shall be discharged are divided into: (a) sensitive areas; and (b) less sensitive areas. This is illustrated in the figure below.

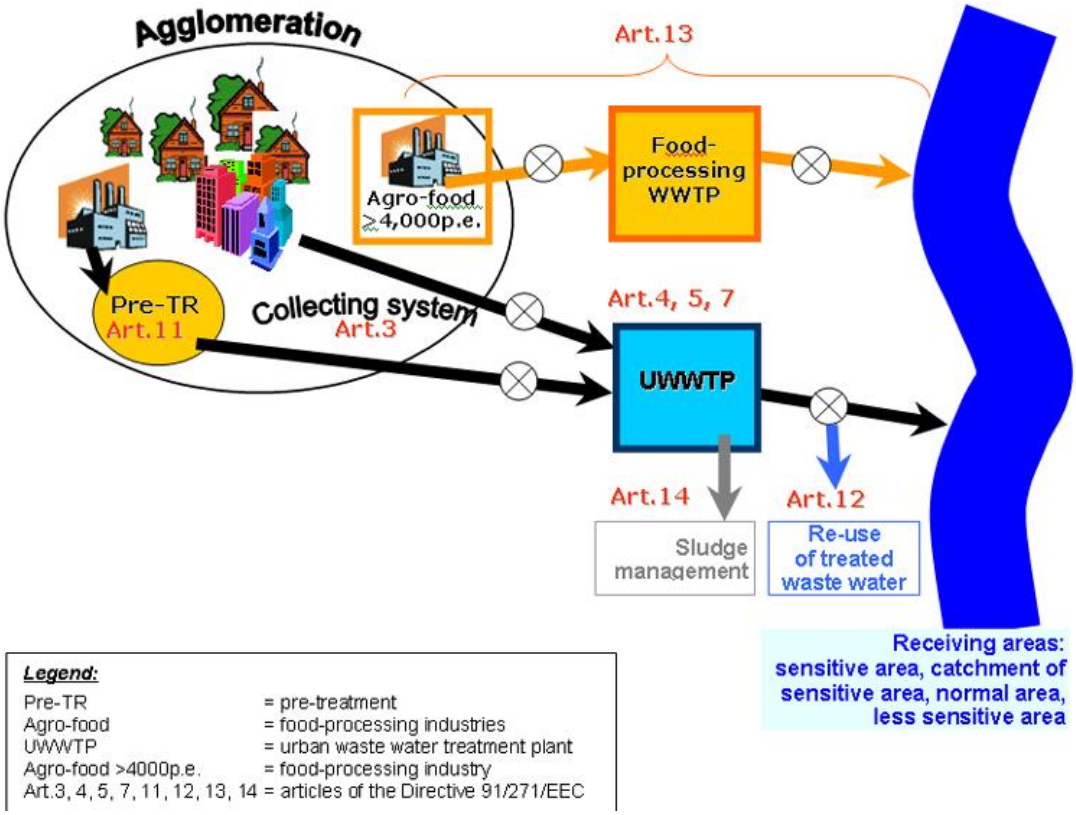

Figure 1: Discharging scheme

Four main principles are laid down in the Directive:

- Planning:
  - The Collection and treatment of wastewater in all agglomerations of >2000 population equivalents (p.e.);
  - Secondary treatment of all discharges from agglomerations of >2000 p.e., and more advanced treatment for agglomerations >10 000 population equivalents in designated sensitive areas and their catchments;
  - A requirement for pre-authorisation of all discharges of urban wastewater, of discharges from the food-processing industry and of industrial discharges into urban wastewater collection systems.
- Regulation.
- Monitoring by Competent authorities or appropriate bodies:
  - Monitoring of the performance of treatment plants and receiving waters;
  - Controls of sewage sludge disposal and re-use, and treated wastewater re-use whenever it is appropriate;

- Discharges from urban wastewater treatment plants to verify compliance with the requirements of Annex I.B.

- Information and reporting:
  - Information collected by competent authorities or appropriate bodies in complying with paragraphs 1, 2 and 3 shall be retained in the Member State and made available to the Commission within six months of receipt of a request.

Specifically, the Directive requires:

- The Collection and treatment of wastewater in all agglomerations of >2000 population equivalents (p.e.);
- Secondary treatment of all discharges from agglomerations of >2000 p.e., and more advanced treatment for agglomerations >10 000 population equivalents in designated sensitive areas and their catchments;
- A requirement for pre-authorisation of all discharges of urban wastewater, of discharges from the food-processing industry and of industrial discharges into urban wastewater collection systems;
- Monitoring of the performance of treatment plants and receiving waters;
- Controls of sewage sludge disposal and re-use, and treated wastewater re-use whenever it is appropriate.

The Directive states that the discharge of industrial wastewater into collecting systems and urban wastewater treatment plants is subject to prior regulations and/or specific authorizations by the competent authority or appropriate body. Industrial wastewater entering collecting systems and urban wastewater treatment plants shall be subject to such pre-treatment as is required in order to:

- Protect the health of staff working in collecting systems and treatment plants;
- Ensure that collecting systems, wastewater treatment plants and associated equipment are not damaged;
- Ensure that the operation of the wastewater treatment plant and the treatment of sludge are not impeded;
- Ensure that discharges from the treatment plants do not adversely affect the environment, or ensure that receiving waters comply with other Community Directives;
- Ensure that sludge can be disposed of safety in an environmentally acceptable manner.

3.3. Directive 2010/75/EU - Industrial Emissions Directive (IED)

To control industrial emissions, the EU has developed a general framework based on integrated permitting. This means the permits must take account of a plant's complete environmental performance to avoid pollution being shifted from one medium - such as air, water and land - to another. Priority should be given to preventing pollution by intervening at source and ensuring prudent use and management of natural resources. Directive 2010/75/EU of the European Parliament and the Council on industrial emissions (the Industrial

Emissions Directive or IED) is the main EU instrument regulating pollutant emissions from industrial installations.

Best Available Techniques (BAT) conclusions are the reference for setting permit conditions for installations covered by Chapter II of the Directive 2010/75/EU. The competent authorities should set emission limit values which ensure that, under normal operating conditions, emissions do not exceed the emission levels associated with the best available techniques as laid down in the BAT conclusions.

The most specifically focused in wastewater treatment are the **Conclusions for common wastewater and waste gas treatment/management systems in the chemical sector** (CWW BAT conclusions - Commission Implementing Decision (EU) 2016/902 of 30 May 2016). Although other BAT conclusions and reference documents (BREF) deal with wastewater treatment.

Independently operated treatment of wastewater not covered by Directive 91/271/EEC and discharged by an installation covered by Chapter II of the Directive is an activity subjected to an IED permit.

With regard to indirect releases of polluting substances into water, the effect of a water treatment plant may be taken into account when determining the Emission Limit Values (ELV) of the installation concerned, provided that an equivalent level of protection of the environment as a whole is guaranteed and provided this does not lead to higher levels of pollution in the environment.

3.4. Regulation (EC) No 166/2006: the European Pollutant Release and Transfer Register (E-PRTR)

Regulation (EC) No 166/2006 of the European Parliament and of the Council of 18 January 2006 established the European Pollutant Release and Transfer Register (E-PRTR), in the form of a publicly accessible electronic database. This database meets the requirements of the United Nations Economic Commission for Europe (UN-ECE) Protocol on Pollutant Release and Transfer Registers, signed by the EU in May 2003. This register is available to the public free of charge on the internet. The information it contains can be searched using various criteria (type of pollutant, geographical location, affected environment, source facility, etc.).

The register contains information on releases of pollutants to air, water and land, as well as off-site transfers of pollutants present in waste-water and waste. The register covers 91 pollutants listed in Annex II, including greenhouse gases, other gases, heavy metals, pesticides, chlorinated organic substances and other inorganic substances; release data to water for each pollutant exceeding threshold value (according to Annex II of the Regulation) have to be produced by the operator.

Releases are reported when the level of emissions exceeds a certain threshold and originates from one of the 65 activities listed in Annex I. The majority of these activities are also regulated under the Directive on industrial emissions and comprises, in particular, the establishments covered by the following sectors: energy production, mineral industry, chemical industry, waste and wastewater management, and paper and wood production and processing.

Where available, the register also provides some information on pollution from diffuse sources.

The regulation is a key instrument in delivering the requirements of the Aarhus convention as it provides the public with the opportunity to be involved in further developing the register and preparing amendments.

3.5. Recommendation 2001/331/EC minimum criteria for environmental inspections in the Member States (RMCEI)

The RMCEI contains non-binding criteria for the planning, carrying out, following up and reporting on environmental inspections. Its objective is to strengthen compliance with EU environment law and to contribute to its more consistent implementation and enforcement in all Member States. The RMCEI covers all industrial installations, companies and facilities that need authorisation, permit or licensing requirements under EU law. Such installations are also called “controlled installations” in the RMCEI.

This Recommendation suggests that all environmental inspection tasks should be carried out according to a minimum criteria applied in the organising, carrying out, following up and publishing the results of such tasks, in order to strengthen the compliance with environmental law.

Besides providing general obligations for Member States (MS), such as aiming for high environmental protection and cross-border cooperation, the RMCEI deals with four main areas:

- Establishing plans for environmental inspections of installation;
- Performing inspection;
- Reporting on inspection;
- Investigating serious accidents, incidents and occurrences of non-compliance.

4. Linked IMPEL projects

4.1. Integrated water approach (2017)

The implementation of EU legislation on water and land has been identified as one of the top challenges in recent IMPEL research.

The objective of this project is to identify, both from the regulatory and technological point of view, how the water resource is managed today in the industry sector subjected to the Integrated Environmental Permitting (IEP) regulation.

The main aim of this project is to compare and share, among the IMPEL members, the implementation of EU legislation relating to water resources management and protection in industrial installations and activities. New approaches for reducing freshwater consumption and over-abstraction of water are to be identified, enhancing water reuse through process analysis, water balance and utilities optimization.

This project is also focused on the implementation of innovative technologies for industrial water treatment able to provide energy saving, sludge production minimization and re-use of treated waste waters, allowing to respect the required discharge limits.

The Final Report of the project (2017) can be found at the following web address:
https://www.impel.eu/wp-content/uploads/2018/06/FR-2017-10-Integrated-Water-Approach-Guidance.pdf

4.2. Linking the Water Framework and IPPC/IE Directives (2010-2013)

The IED Directive 2010/75/EU and Water Framework Directive 2000/60/EC are two of the most wide-reaching items of EU environmental law. They have presented many challenges to the Member States.

Installations regulated under IPPC may impact on the water environment, such as through direct or indirect discharges of pollutants, water abstraction, etc. IPPC requires installations to operate in conditions of compliance with Best Available Techniques (BAT). They are also required to respect environmental quality standards established in EU law, including those derived under EU water law. However, the relationship between the two sets of obligations is often far from simple.

Therefore, a phased IMPEL project was started in 2010 to investigate the relationship between both directives. The analysis focused on pressures from point source pollution due to organic (e.g. untreated/partially treated wastewater from agglomeration and industry), nutrient and chemical substance emissions.

Monitoring and sampling of wastewater: JRC Reference Report on Monitoring of Emissions to Air and Water from IED installations (2018).

4.3. Monitoring regimes

The chapter "Monitoring of emissions to water" of the Reference Document (REF) "Reference Report on Monitoring of Emissions to Air and Water from IED installations" includes information on:

- Water pollutants;
- Continuous/periodic measurements;
- Surrogate parameters;
- Toxicity tests and whole effluent assessment;
- Costs.

This REF gives some guidance on measurement and sampling, distinguishing between continuous and periodic measurements, between continuous and periodic sampling, and between composite and spot samples.

In the case of **continuous (on-line) measurements**, no discrete samples are taken. Two types of continuous monitoring techniques can be considered:

1. Fixed in-situ (or in-line) continuous reading instruments. Here the measuring cell is placed in the duct, pipe or stream itself. These instruments do not need to withdraw any sample to analyse it and are usually based on optical properties. Regular maintenance and calibration of these instruments is essential.

2. Fixed on-line (or extractive) continuous reading instruments. This type of instrumentation continuously extracts samples of the emission along a sampling line, transport them to an on-line measurement station, where the samples are analysed continuously. This type of equipment often requires certain pre-treatment of the sample.

In the case of **periodic measurements**, sampling may be carried out continuously or periodically:

- For continuous sampling, the samples are taken continuously with a fixed or variable flow rate. If the sampling flow rate is adjusted continuously to the wastewater flow (flow-proportional), the samples are representative of the bulk water quality. This requires either continuous on-line measurement of the flow rate or a sufficient number of discrete samples for the relevant time period to allow the determination of changes in the wastewater composition. This method is most suitable for taking representative samples of wastewater discharges when the flow rate and concentration of the parameter of interest vary significantly. However, this method can involve higher costs, in particular depending on the number of samples to be analysed; therefore, it is only applied in extraordinary cases.

- For periodic sampling, the samples are taken at different intervals, typically depending on time or wastewater volume flow rate. One example is flow-proportional sampling, in which a predefined amount of sample is taken for each predefined volume of wastewater discharged.

Continuous (on-line) measurement		
Sampling type		**Sample type**
Continuous	Direct measurement in the effluent flow without extraction	No discrete samples
	Time-proportional extraction	
	Flow-proportional extraction	
Periodic measurement (analysis of each separate sample)		
Sampling type		**Sample type**
Continuous	Time-proportional extraction	Discrete samples for short time intervals or composite samples for longer time intervals (e.g. 24 hours)
	Flow-proportional extraction	
Periodic	Time-proportional extraction	
	Flow-proportional extraction	
	Instantaneous extraction	Spot samples

The following main sample types for periodic measurements can be distinguished:

- Composite samples are, by far, the most commonly used samples. They are obtained by mixing appropriate proportions of periodically (or continuously) taken samples. Composite samples provide average compositional data. Consequently, before combining samples, it should be verified that such data are desired and that the parameter(s) of interest do(es) not vary significantly during the sampling period. It is assumed that this is generally the case for industrial wastewater.
- Spot samples are discrete samples taken at random time intervals. They are generally not related to the wastewater volume discharged, but typically used when treating batches of wastewater. The application depends on the parameter, its variations, and the wastewater matrix in the industrial sector.

Several water parameters can be measured continuously as well as periodically. A number of parameters, such as pH, temperature and turbidity, are typically measured continuously, because the results are used for process control and are important to run the wastewater treatment plant properly.

Examples of water parameters that can be continuously measured include the following:

- Water flow;
- Dissolved oxygen, pH and conductivity by direct electrochemical measurements;
- Nitrate and ammonia by specific ion electrodes;
- Metals by anodic stripping voltammetry;
- Ammonia, phosphate, total phosphorus (TP), and iron by spectrophotometry;

- TOC by combustion and IR spectrometry.

Periodic measurements are defined as the determination of a measurand at specified time intervals. In general, these measurements are based on periodic sampling at fixed intervals, which can be time-, volume- or flow-dependent, followed by an analysis of the parameters under investigation in the laboratory (on-site, off-site).

A measurement plan has to be defined, to ensure that emission measurements are adequate for the given measurement objective.

The location of the sampling point(s) should ensure that the sample is representative of the effluent discharge. It is recommended to accurately describe and mark the sampling point on the process flowsheet, if possible supplemented with photographs to facilitate identification of the exact location. Furthermore, the sampling point should be constructed to fit sampling equipment and with room for personnel to service the equipment.

Monitoring in BAT conclusions is usually based on flow-proportional composite samples. However, time proportional composite samples may lead to equally representative results provided that the variations in the concentrations or flows are small.

Taking composite samples over a period of 24 hours is usually automatic; instruments automatically withdraw a portion of sample at the appropriate volume discharged or time. It is advisable that the total sample volume is as large as is reasonably practicable to accommodate. In addition, it is necessary to consider the stability of the target parameter over the total sample collection time, as samples may deteriorate or adhere to the walls of the sampling container while being kept in the automated sampling device. In order to preserve, the composite sample it is often cooled and chemicals might be added.

4.4. Sampling equipment

The choice of sample container is of major importance to preserve the integrity of the samples (e.g. to prevent sample contamination or losses due to adsorption or volatilisation). For the sampling of waste water, plastic containers are generally recommended for most parameters. Glass containers are generally used for the measurement of oil, grease, hydrocarbons, detergents, and pesticides [152, ISO 1992]. EN ISO 5667-3:2012 includes detailed provisions on the types of containers to be used, depending on the parameter. This standard is complementary to other, more specific measurement standards which provide more detailed information on the required type of container and its pre-treatment.

Typical simple devices used for manual sampling include buckets, ladles, or wide-mouthed bottles that may be mounted on a handle of a suitable length. Another possibility is to use Ruttner or Kemmerer samplers which consist of a tube with a hinged lid at each of its ends.

Automated sampling to obtain flow- or time-proportional samples can be carried out with several different devices which may be using a chain pump (paternoster pump), a peristaltic pump or compressed air and/or vacuum.

EN ISO 5667-3:2012 provides general information on the preservation and handling of water samples, including maximum storage times. To preserve pollutant concentrations that may change during sample storage, the following measures may be necessary, depending on the wastewater composition and the pollutant concerned:

- Storage of the sample in the dark;
- Cooling of the sample;
- Filtration of the sample;
- Stabilisation of the sample with acids, alkalis, or other chemicals;
- Re-dissolution of precipitates.

5. Wastewater management: Best Available Techniques in different industrial sectors

Wastewater management, collection and treatment, as well as water saving measures, are part of the BAT Conclusions that were published in the Official Journal of the European Union for different industrial sectors.

The following BAT Conclusions covering wastewater treatment have been published so far:

- Decision (EU) 2012/134/EU (GLS: Manufacture of Glass);
- Decision (EU) 2012/135/EU (IS: Iron and Steel Production);
- Decision (EU) 2013/732/EU (CAK: Production of Chlor-alkali);
- Decision (EU) 2013/84/EU (TAN: Tanning of Hides and Skins);
- Decision (EU) 2014/687/EU (PP: Production of Pulp, Paper and Board);
- Decision (EU) 2014/738/EU (REF: Refining of Mineral Oil and Gas);
- Decision (EU) 2015/2119 (WBP: Wood-based Panels Production);
- Decision (EU) 2016/902 (CWW: Common Wastewater and Waste Gas Treatment/Management Systems in the Chemical Sector);
- Decision (EU) 2016/1032 (NFM: Non-ferrous Metals Industries);
- Decision (EU) 2017/302 (IRPP: Intensive Rearing of Poultry and Pigs);
- Decision (EU) 2017/1442 (LCP: Large Combustion Plants);
- Decision (EU) 2017/2117 (LVOC: Large Volume Organic Chemicals);
- Decision (EU) 2018/1147 (WT: Waste Treatment).

The BREF "Common Wastewater and Waste Gas Treatment/Management Systems in the Chemical Sector" is particularly focused in the treatment of wastewater; a short description of this BREF and a list of the main requests of the above listed BAT Conclusions for a proper management of wastewater is given below.

The REF "Monitoring of Emissions to Air and Water from IED installations" summarizes information on the monitoring of emissions to air and water from IED installations, thereby providing practical guidance for the application of the Best Available Techniques (BAT) conclusions on monitoring in order to help competent authorities to define monitoring requirements in the permits of IED installations.

5.1. BREF Common Wastewater and Waste Gas Treatment/ Management Systems in the Chemical Sector

This BREF for Common Wastewater and Waste Gas Treatment/Management Systems in the Chemical Sector concerns the activities specified in Sections 4 and 6.11 of Annex I to Directive 2010/75/EU, namely:

- Section 4: Chemical industry;
- Section 6.11: Independently operated treatment of wastewater not covered by Council Directive 91/271/EEC and discharged by an installation undertaking activities covered under Section 4 of Annex I to Directive 2010/75/EU.

This document also covers the combined treatment of wastewater from different origins if the main pollutant load originates from the activities covered under Section 4 of Annex I to Directive 2010/75/EU.

Chapter 2 of the BREF provides data and information concerning the environmental performance of wastewater treatment plants (WWTPs) at chemical sites.

Chapter 3 describes in more detail the techniques to prevent or, where this is not practicable, to reduce the environmental impact of operating installations in this sector that were considered in determining the BAT. This information includes, where relevant, the environmental performance levels (e.g. emission and consumption levels) which can be achieved by using the techniques, the associated monitoring and the costs and the cross-media issues associated with the techniques.

Chapter 4 presents the BAT conclusions as defined in Article 3(12) of the Directive.

The Commission Implementing Decision (EU) 2016/902 of 30 May 2016 established Best Available Techniques (BAT) conclusions for common wastewater and waste gas treatment/management systems in the chemical sector. These BAT conclusions cover, particularly, the following issues referred to water treatment:

- Environmental management systems;

- Water saving;
- Wastewater management, collection and treatment;
- Waste management;
- Treatment of wastewater sludge.

The techniques listed and described in this BAT conclusions, although generally applicable, are neither prescriptive nor exhaustive. Other techniques may be used that ensure at least an equivalent level of environmental protection.

5.2. BAT in wastewater management: an insight on the BREFs

Some common key BATs can be found in the issued BAT conclusions; these are here listed as they are generally present in the wastewater management of all the industrial sectors:

Environmental management systems

In order to improve the overall environmental performance, BAT is to implement and adhere to an environmental management system (EMS). Establish and maintain an inventory of wastewater streams, as part of the environmental management system, that incorporates information about the characteristics of the waste water.

Sampling and Monitoring

- Monitoring of key process parameters (including continuous monitoring of wastewater flow, pH and temperature) at key locations (e.g. influent to pre-treatment and influent to final treatment).
- BAT is to use ISO 5667 for water sampling and to monitor the emissions to water at the point where the emission leaves the installation.
- Monitoring emissions to water in accordance with EN standards with at least a fixed minimum frequency (varying for the different industrial sectors).
- Monitoring the outlet of a defined pre-treatment (e.g. in the LVOC BATc).
- Monitoring the outlet of the final treatment of combined effluents (e.g. in the CWW BATc).

Emission levels

- Emission levels associated with the best available techniques (BAT-AELs) for emissions to water usually refer to values of concentrations (mass of emitted substances per volume of water), expressed in µg/l or mg/l. Unless otherwise stated, the BAT-AELs refer to flow-weighted yearly averages of 24-hour flow-proportional composite samples, taken with the minimum frequency set for the relevant parameter

and under normal operating conditions. Time-proportional sampling can be used provided that sufficient flow stability is demonstrated.

- In some cases, yearly average is an average of all daily averages taken within a year, weighted according to the daily production, and expressed as mass of emitted substances per unit of mass of products/materials generated or processed (pulp and paper industry).
- The BAT Associated Emission Levels (BAT-AELs), set in the CWW BATc, apply to direct emissions to a receiving water body from:
    - The activities specified in Section 4 of Annex I to Directive 2010/75/EU;
    - Independently operated wastewater treatment plants specified in Section 6.11 of Annex I to Directive 2010/75/EU provided that the main pollutant load originates from activities specified in Section 4 of Annex I to Directive 2010/75/EU;
    - The combined treatment of wastewater from different origins provided that the main pollutant load originates from activities specified in Section 4 of Annex I to Directive 2010/75/EU.

Reducing emissions to water

- Reduce the volume and/or pollutant load of wastewater streams, to enhance the reuse of wastewater within the production process.
- Maximise internal recycling.
- Remove insoluble and soluble polluting substances:
    - Removal of insoluble substances by recovering oil (API Separators (APIs), Corrugated Plate Interceptors ecc.); removal of insoluble substances by recovering suspended solids and dispersed oil (Sand Filtration, dissolved Gas Flotation (DGF) ecc);
    - Removal of soluble substances including biological treatment and clarification: Biological treatment techniques may include Fixed bed systems or Suspended bed systems.
- In order to prevent the contamination of uncontaminated water and to reduce emissions to water, BAT is to segregate uncontaminated wastewater streams from wastewater streams that require treatment (Water and drainage system for segregation of contaminated and uncontaminated water streams).
- Avoid sending non-contaminated water to general wastewater treatment.

Reducing the volume of wastewater sludge

In order to reduce the volume of wastewater sludge requiring further treatment or disposal, and to reduce its potential environmental impact, BAT is to use one or a combination of the techniques given below.

- Conditioning. Chemical conditioning (e.g. adding coagulants and/or flocculants) or thermal conditioning.
- Thickening/dewatering. Thickening can be carried out by sedimentation, centrifugation, flotation, gravity belts, or rotary drums. Dewatering can be carried out by belt filter presses or plate filter presses.

- Stabilisation. Sludge stabilisation includes chemical treatment, thermal treatment, aerobic digestion, or anaerobic digestion.
- Drying. Sludge is dried by direct or indirect contact with a heat source.

Treatment

- BAT is to use an integrated wastewater management and treatment strategy that includes an appropriate combination of the techniques
    - Process-integrated techniques: Techniques to prevent or reduce the generation of water pollutants.
    - Recovery of pollutants at source: Techniques to recover pollutants prior to their discharge to the wastewater collection system.
    - Wastewater pre-treatment: Techniques to abate pollutants before the final wastewater treatment. Pre-treatment can be carried out at the source or in combined streams.
    - Final wastewater treatment by, for example, preliminary and primary treatment, biological treatment, nitrogen removal, phosphorus removal and/or final solids removal techniques before discharge to a receiving water body.
- BAT is to pre-treat wastewater that contains pollutants that cannot be dealt with adequately during final wastewater treatment by using appropriate techniques. In general, pre-treatment is carried out as close as possible to the source in order to avoid dilution, particularly for metals. Sometimes, wastewater streams with appropriate characteristics can be segregated and collected in order to undergo a dedicated combined pre-treatment. Use an adequate pre-treatment for each final flow.
- When further removal of organic substances, nitrogen or phosphorus is needed, BAT is to use tertiary treatment (pulp and paper industry).

Prevent or reduce odour emissions

In order to prevent or to reduce odour emissions from wastewater collection and treatment and from sludge treatment, BAT is to use one or a combination of the techniques given below.

a) Minimise residence time of wastewater and sludge in collection and storage systems, in particular under anaerobic conditions.
b) Chemical treatment. Use chemicals to destroy or to reduce the formation of odorous compounds (e.g. oxidation or precipitation of hydrogen sulphide).
c) Optimise aerobic treatment. This can include: (i) controlling the oxygen content; (ii) frequent maintenance of the aeration system; (iii) use of pure oxygen; (iv) removal of scum in tanks.
d) Enclosure. Cover or enclose facilities for collecting and treating wastewater and sludge to collect the odorous waste gas for further treatment.
e) End-of-pipe treatment. This can include: (i) biological treatment; (ii) thermal oxidation. Biological treatment is only applicable to compounds that are easily soluble in water and readily bio eliminable.

5.3. Wastewater technologies used in industrial process: general analysis

The main unit processes used at the final WWTPs are:

- Physical-chemical and biological treatment or only biological treatment:
  - Complete mix activated sludge (CMAS) flat tank;
  - CMAS tower biology;
  - Membrane bioreactor;
  - Activated sludge without further specification;
  - Fixed-bed reactor;
  - Expanded-bed process;
  - Biological treatment without further specification.

- Physical-chemical treatment only:
  - Neutralisation;
  - Precipitation/coagulation/flocculation;
  - Crystallisation;
  - Skimming;
  - Oil-water separation;
  - Oxidation with H_2O_2;
  - Stripping;
  - Activated carbon filtration.

With respect to the *final solids (TSS)* removal step, the following techniques are applied at the WWTPs:

- Sedimentation;
- Ultrafiltration, including membrane bioreactor;
- Sand filtration;
- Filtration without further specification;
- Flotation;
- Reverse osmosis.

Depending on the *organic load* of the influent, a variety of pre-treatment processes are used, including:

- Additional activated sludge processes;
- Trickling filters;
- Fixed-bed reactors;
- Anaerobic pre-treatment;
- Oxidation;
- Oil-water separation;
- Stripping.

Several of the WWTPs apply *nitrogen and/or phosphorous* removal:

- Biological nitrification/denitrification;
- Chemical phosphorous precipitation.

Unit for wastewater *sludge* reduction:

- Conditioning;
- Thickening/dewatering;
- Stabilisation;
- Drying.

6. Industrial wastewater re-use

Reusing water in industry has the potential to reduce the costs of water supply and wastewater treatment by industries and reduces pressure on water resources. Industry may reuse its own treated wastewater or that from another industry. It may also reuse treated wastewater from an urban WWTP. Water reuse is in the direction of compliance to the water efficiency objectives of the Industrial Emissions Directive. It is also important to note that water reuse by industry may be part of wider recycling of resources between industrial and other users in systems known as 'industrial symbiosis' to provide significant savings to water abstracted from natural water bodies.

Industrial water from treated wastewater replaces the use of abstraction of ground or surface water by the industry itself and may also reduce the discharge of treated wastewater into the environment, thereby limiting the introduction of those pollutants which are not removed from the wastewater by primary and secondary treatment. Uses of appropriately treated wastewater in industry include cleaning, cooling and boiler feed.

The degree of water reuse in industry differs significantly across industrial sectors and is strongly dependent on both the nature of the industrial process and local circumstances as well as the proximity of the industry to the water supply.

The figure shows the development of industrial reuse of treated wastewater:

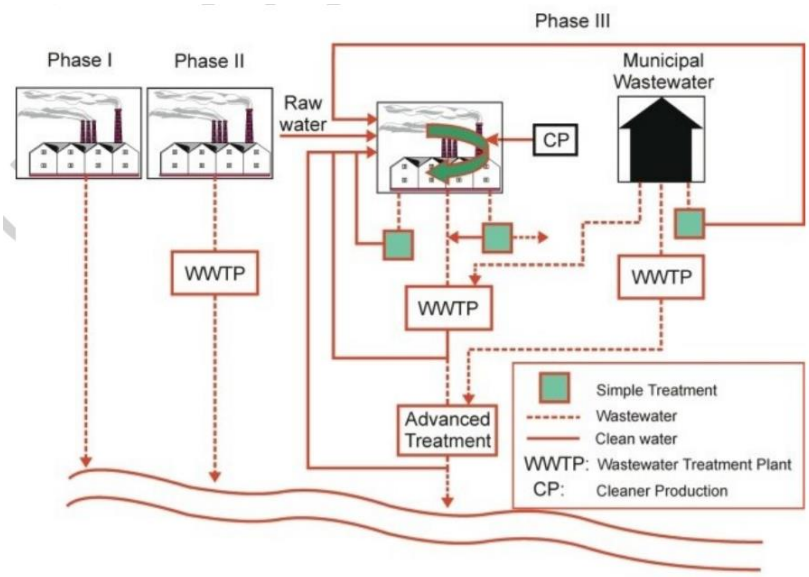

Figure 2: Development of industrial wastewater treatment and reuse

It is important to note that industrial water reuse is highly determined by the exact quality needs of the individual industrial process and/or product as well as the costs of producing water of the required quality compared to other suitable sources.

Major users of water and producers of wastewater include the chemical sector, paper and pulp production sector, beverage sector, textile sector and aggregates sector. Users may also benefit if water reuse provides water of a guaranteed quality.

It is firstly important to note that Art. 12.1 of the Directive 91/271/EEC states that “Treated wastewater shall be reused whenever appropriate. Disposal routes shall minimise the adverse effects on the environment”. Therefore, the UWWTD makes two direct statements regarding reused treated wastewater:

- Wastewater shall be reused whenever appropriate.
- Member States shall minimise any adverse effects on the environment from reuse of wastewater.

Industrial wastewater is addressed under Art. 11 and Art. 13 of the Directive 91/271/EEC. Art. 11 requires that industrial wastewater discharged into collecting systems that lead to a UWWTP is subject to prior authorisation and that the conditions impose satisfy the requirements of Annex IC. If it is decided that water from the WWTP should be reused, conditions may need to be imposed on the quality of the industrial discharges to ensure that this is possible.

Art. 13 concerns certain industrial activities (mainly food and beverage industries) listed in Annex III of that Directive which have their own wastewater treatment systems, and which do not discharge to UWWTPs. Art. 13 requires that such discharges are also subject to prior authorisation before discharge. If such water were to be considered for reuse, then the prior authorisation would likely require amendment to ensure that the level of treatment meets the quality objectives for the particular use of the reuse water.

7. Self-monitoring report: minimum content

Self-monitoring is performed:

- In order to control and optimize the operation of wastewater treatment plants;
- To verify compliance with ELVs set up in the permit or general binding rules;
- To comply with the obligations for self-monitoring set up in the permit or general binding rules (e.g. referring to the monitoring as described in the BAT conclusions);
- For reporting purposes (e.g. PRTR);
- For other reasons (e.g. environmental liability, wastewater fees, water reuse, environmental audits, etc.).

The scope for the self-monitoring report in terms of parameters and assessment usually needs to be defined in the permit or by some agreement of the competent authority and the operator.

It may contain the following pieces of information:

- Timing of the sample: date, hour, etc.;
- Identification of each point of measurement: coordinates, process from which the wastewater originates, wastewater flow;
- Statistical analysis for each parameter, e.g. number of measurements, number of measurements below detection limit, median or average, 90-Percentile, maximum;
- Date and results of the individual measurements (concentration and/or loads);
- Comparison of self-monitoring results with ELVs;
- Information on applied (standard) methods for sampling and analysis, and deviation from the methods (e.g. due to conditions of the sample);
- Identification of the person taking the sample (accredited or not);
- Maintenance and calibration information for online analysers;
- Information needed for the interpretation of data (e.g. regarding maxima and trends), e.g. changes in production or in wastewater treatment, other than normal operating conditions (OTNOC) events, extreme weather conditions.

Ideally, the report does not contain confidential information. If confidential information needs to be included, an additional excerpt including only the non-confidential information could be provided to respond to third-party information requests.

With respect to the minimum content, the following potential elements may be highlighted:

- For discharges from IED installations, the annual report should comprise the wastewater flow and all parameters that are subject to ELVs (e.g. BAT-AEL).
- The annual report should include all relevant discharges of pollutants to surface waters or external wastewater treatment plants, that are subject to the Environmental Quality Directive (EU-D 2008/105/EG, amended by EU-D 2013/39/EU).
- The annual report may include all PRTR parameters which are or potentially could be discharged beyond the PRTR thresholds.
- Annual reports for indirect discharges from IED installations to municipal treatment plants shall also consider parameters which are relevant for the wastewater collection and treatment system.

The entity of measurements per parameter that is considered in the annual report may refer to the minimum monitoring frequency as prescribed in the permit or to the number of measurements that have been actually performed by the operator which in some cases may be substantially higher.

8. Inspections in wastewater treatment plants: indications

The aim of the inspection is to check compliance of the operator with the operating/environmental conditions set in the issued permit.

8.1. Before the inspection: desktop study

The inspection team should be fully prepared for the inspection. It should therefore gather all the relevant information and data that is available.

The collection and evaluation of existing information about the installation is critical for the success of the inspection. Examples of information to be collected are listed below:

- Reports of previous inspections of the site;
- Application for the permit;
- Environmental permit/s and self-monitoring plan: provisions for water treatment and discharge;
- Monitoring data at the discharging point and build the trend (e.g. final effluent to surface water or to urban wastewater collection system); data should be included in the Environmental self-monitoring reports;
- List of analytical methods used in the installation;

- Layout of the water treatment plant: wastewater streams and sections of the plant (partial discharging point to avoid mixing);
- BREF for Common Wastewater and Waste Gas Treatment/Management Systems in the Chemical Sector and sectorial BREF;
- List of EMS technical procedures related to management of the treatment.

The issues that should be considered while examining self-monitoring results (self-monitoring register, last lab analysis) are as follows:

- Checking if the self-monitoring is done in line with the permit, e.g. checking the frequency, parameters measured, equipment used;
- Checking if the reference methods for taking samples and making measurements and analysis were used;
- Checking whether a certified (accredited) laboratory did collection of samples and analysis;
- Check data about efficiency of the treatment (trend);
- Checking if emission limit values were breached.

Based on the evaluation of the collected information the following must be prepared:

- Relevant questions which will be used for the operator's interview;
- A check list to facilitate the inspection;
- An outline of the "critical" ELV (e.g. those parameters which significantly contribute to the pollution load coming out of the installation);
- The list of BATs (according to the issued permit) which the operator should have installed and operated;
- The list of documentation to be provided by the operator (e.g. self-monitoring records, annual reports submitted to the authorities);
- Agenda of the inspection (see next subsection);
- Analytical devices for an on-site sampling of the discharged water.

The preliminary analysis of the collected documentation must enable a better understanding of the cycle of the water treatment plant and its past and current critical points. Advantages of using a checklist (see Annex to have an example) are:

- To ensure all necessary aspects will be inspected;
- A better organisation of the interview and site visit;
- Time rationalisation;
- Fast assessment of the non-compliance situations.

8.2. During the inspection

The aim of the inspection will be to check compliance of the operator with the operating/environmental conditions set in the issued permit.

The checklist and the operating/environmental conditions set in the issued permit will be the "guidance" throughout the inspection. If necessary, take samples, and/or define the samples that should be taken by a certified (accredited) laboratory or try to be on site when the samples are taken randomly so the inspector knows it is done right.

During the documentation checking, the following items should for example be verified:

- Self-monitoring register (last lab analysis);
- Assess change in treatment efficiency by comparing the most recent data with the trend (check permit conditions if present);
- Maintenance operations register;
- Communications to the competent authority (threshold breaches, etc.);
- Liquid waste input/output register;
- EMS procedures.

During the inspection visit, the sections of the wastewater treatment plant have to be investigated, with the following main purposes:

- Check correspondence of the points of discharge with those indicated in the permit;
- Check the wastewater streams in order to assess that compliance with the limits is not achieved by dilution;
- Check procedures, competences (training) and tools used by the operator or third company to take samples;
- Check if all the sections of the plant are working;
- Check how the sludge (produced by the treatment) is treated and which is the final destination (e.g. use in agriculture, incineration, landfill, etc.);
- Check which parameters are continuously monitored (e.g. flow, pH, etc.);
- Check maintenance of devices and calibration;
- Check how rain water is managed (first flush collection and treatment);
- System to collect not treated water in case of heavy rain;
- Check if any kind of pre-treatment is needed for the pollutants that will not be affected by the final treatment;
- Check if treated water is re-used or discharged.

It is also crucial to investigate how the company deals with **severe weather conditions**, checking EMS procedures and equipment in place; for example, the installation should know how to tackle severe rainwater conditions, to prevent an overflow of the water treatment basins and therefore limiting the opening of emergency discharging systems to the environment (sea, river) of untreated wastewater streams.

8.3. Sampling

Sampling is the action to extract a (waste) water mass with a view to investigating a number of clearly defined properties. A representative sample is a sample whose composition corresponds to that of the wastewater to be investigated or a specific part thereof.

8.3.1 Auditing

When the inspection group is auditing the sampling and analysis activities of the operator (or of a third part), the aim of the site inspection should be to check:

- The compliance of the operator with the reference methods adopted for taking samples and making measurements and analysis, related to conditions set in the monitoring plan (and permit);
- The qualified competences of the operators (training, personnel certification registrations, etc.);
- The accredited laboratory collected samples and analysis, and relative signature of the responsible.

ISO 5667 establishes general requirements for sampling, preservation, handling, transport and storage of all water samples including those for biological analyses.

8.3.2 Performing sampling

Monitoring may also be performed by authorities or on behalf of authorities by third-party laboratories as:

- Periodic monitoring;
- Monitoring to react on incidents and complains;
- Projects to assess the quality and impacts of the wastewater beyond the permit requirements;
- Sampling during an inspection.

Some Inspection authorities can perform sampling by their own. Periodic monitoring usually will be more frequent than inspections (e.g. 3-12 times per year) and less frequent than self-monitoring. In order to ascertain whether the limits of acceptability, as set by current legislation, are complied with, the sampling of the wastewater must be carried out at the sampling point, at the outlet of the final treatment or the point of discharge to the receiving water body or the urban wastewater system. The sampling well must be easily accessible and of adequate size.

Some Inspection authorities can perform sampling by their own. In order to ascertain whether the limits of acceptability, as set by current legislation, are complied with, the sampling of the wastewater must be carried

out at the sampling point, at the outlet of the final treatment or the point of discharge to the receiving water body or the urban wastewater system. The sampling well must be easily accessible and of adequate size.

The sampling may be instantaneous (withdrawing a suitable volume of effluent in one solution), medium composite (obtained by mixing a number of samples, taken in a given period of time; from it you get the required volume for analysis), continuous (continuous withdrawal of a portion of the effluent for a certain time period to obtain the volume required for the analysis).

Devices and tools should preferably be made of inert material. The preference is for stainless steel because teflon (PTFE) is very expensive and the other materials have limitations:

- Corrosion resistant steel (stainless steel) is suitable for all groups of parameters.
- Thermoplastic (pe, pvc) is unsuitable for the sampling of organic compounds but is suitable for the other applications.
- Fluoropolymer (ptfe, tfe) is suitable for all groups of parameters.

The sample bottles must be clean and made of the proper material and of the correct size to transport and store wastewater samples. A proper bottle should be used for each group of pollutant:

Pollutant	**Bottle**	**Volume (minimum)**
Metals	Plastic	50 ml
VOC	Glass	40 ml (vials 100% off)
Total hydrocarbons Fats and oils Chlorinated / phosphoric pesticides Phenols and / or aldehydes IPA	Dark glass	250 ml
Microbiology - E.Coli	glass / plastic sterile	300 ml – 1 l

Handle the following filling rate of the sample bottle:

- Complete the bottle for volatile parameters for 100% off;
- Do not fill the mineral oil bottle by more than 80%;
- Fill in the bottle for inorganic parameters for 90%.
- If the parameter to be analysed is not known, go to the lowest fill rate of 80%.

Samples should be transported as soon as possible in the laboratory, however they should not be kept longer than 4 hours at temperatures above 10 ° C; as far as the samples for microbiological analysis are concerned, they should be maintained both during transport and in the laboratory at a temperature of 3-5°C.

A sampling lists and labels for the sampling bottles should be prepared in advance. The sampling lists contain all the information required for sampling such as:

- Name and object code of the loader;
- Description and code of the sampling point;
- Lab Info Number;
- Sampling method (stitch / collect);
- Analyse parameters;
- Conservation.

Use clean gloves and prevent the sample from being contaminated from the environment.

8.4. Dealing with violations

Survey results on violations

A survey covering all aspects from permit procedure to inspection and sampling/analysis has been circulated within IMPEL members (Annex 2). 19 Member States and country regions answered the survey. The overall results are described in Chapter 9.

Two basic systems of dealing with the violation can be distinguished among the answers to the survey:

- One of them is the case where further proceedings are conducted by the Authority.
- The second is where proceedings are handled over to police, public prosecutor and competent judicial authorities.

Breaches in the Self-monitoring Report

If a breach of the limit value is declared within the self-monitoring report, provided by the operator to the competent authority, these data are possible to be used to take further actions. There is no country when that data cannot be used in any action. But that actions differs in countries. This may be a penalty imposed directly on the basis of these measurements or measurements may be the introduction to other verifying actions leading to penalty.

In the first situation after receiving measurement results for an appropriate period of time, Inspection Authority is checking it and, in case of non-compliance with the values set in the permit, a decision imposing an administrative penalty is issued. At the request of the operator, the Authority may postpone the deadline for payment of the administrative penalty if it carries out the enterprise (project/operation) which may constitute a basis for postponing the penalty. If the enterprise has been completed in due time, as confirmed by the quality of the purified effluent, the penalty is discontinued. The operator has also the right to appeal against the decision imposing the penalty to the second instance authority.

In the second situation, a breach of the limit values declared within the self-monitoring report does not constitute itself an automatic evidence of the violation. It has to be technically verified and that should be performed by the inspection authority. Often after submitting self-monitoring report with declared breach of emission limit value competent authority make action for verifying non-compliance and it this is done by asking the operator for more details or by making site inspection. In some countries penalty can be set only after one inspection on the plant where those results are observed.

Self-monitoring reports are also used as tools for checking the compliance with the permit conditions.

If non-compliance is noticed from such reports than an inspection on site is undertaken in order to enforce the permit condition. Usually this means that the operator is punished by a penalty for breaching the permit conditions but also a permit suspension may be taken into consideration. Punishment may be imposed but two more analysis has to be done and the inspector has to be present during sampling. If the average value of three result (one from self-monitoring) exceeds the limits, then the authority can issue a penalty. When such a breach is reported, the Authority requests further corrective action to rectify that breach. Moreover, should the operations result in exceedance of the emission limit values indicated in the permit, the operator is required to designate a mixing zone as stipulated in the requirements of the Water Framework Directive or to apply for derogation from achieving the required emission levels.

Enforcement

Among countries in which permit is not issued by the same Authority that check compliance with permit conditions it is usually the inspector who conducts proceedings (but not in all cases).

In other systems the competent authority itself can't issue a fine. If there are exceedances of the terms of approval, this will be excluded by the state/ the municipality - and may end with a police report and a fine. The police conducts the investigations. If there has been a crime, police hands over the case to the public prosecutor. If the case goes to the court, the competent authority is called to the court as a witness. The fine is imposed by the court. Authority may also order a stop of the discharge of waste water.

In most countries the sanction for exceedance of wastewater discharge quality are imposed by inspection bodies on the basis of control measurements. In fewer cases penalties are imposed by permitting authority or other competent authority, usually after non-compliance are reported to that authority by inspection. Operator may have a right to ask for postponing the deadline for payment, to appeal to higher instance authority, to submit a complaint against penalty report to the competent court, to spread the penalty into instalments. The smallest number of cases is when penalties are imposed only by court.

Type of punishment for exceeding the permissible conditions depends on the severity of the crime and if done on purpose or on pure negligence, and on the impact in the environment. Usually the punishment is to impose a fine. Only in cases where there is an imminent threat of damage to the environment or if operator does not restore the non-compliance situation or if it's a second breach, the authority may issue decisions such as closure of the plant or part of it or the withdrawal of the permit.

Type of punishment:

- Fine by authority (some with maximum upper limit, e.g. 4 000 euros).
- Monetary fines by court.
- Jail.
- Restriction operation.
- Prohibiting operation by court.
- Suspension of the permit.
- Cancelation of the permit.
- Remediate measures.
- Closing down a part of the installation or the entire installation.
- Official warning.
- Order of penalty payment.
- Administrative enforcement.
- Withdrawal of the permit.
- Withdrawal of bank guaranties.

8.5. EMS Procedures

It is important to check the Environmental Management System (EMS) that the operator should implement. The EMS is considered in every BAT conclusions, as a Best Available Technique, but it is not compulsory to have an EMS certification (EMAS, ISO 14001), as far as it could be an internal process. Checking compliance of EMS procedures is particularly relevant when the EMS is not certified.

It is fundamental to check how the operator is able to tackle possible malfunctions of the wastewater treatment plant, causing environmental critical situations.

During the inspection visit, the sections of the wastewater treatment plant have to be investigated, with the following main purposes:

- List of procedures/instructions of Environmental Management System (EMS) to understand how the process is covered by documentation;

- List of procedures/instructions of Environmental Management System (EMS) to understand if severe weather conditions are tackled;
- List of critical devices for the environment (e.g. parts, devices, instruments of measures in the wastewater treatment plant) to focus the main environmental aspects;
- Maintenance procedures and related registrations (check frequencies and manner registration on wastewater treatment plant);
- Checking performance and taking corrective action (e.g. does the company take action systematically following the examination of deviations and near deviations as a means to improve the compliance performance?);
- Monitoring and measurement (e.g. does the company communicate in their annual report the performance in relation to all relevant regulatory requirements?);
- Environmental Emergency scenarios and related actions.

8.6. Relevant criteria to be considered for risk assessment (IRAM tool)

Pursuant to the Industrial Emission Directive (IED) all inspections should be planned in advance. Therefore, the competent authority must draw up inspection plans and programs for installations and establishments, including the frequency of site visits. These frequencies should be based on a systematic risk appraisal. Within the IMPEL project "Easy tools" a new rule-based methodology was developed and tested, called Integrated Risk Assessment Method (IRAM) where each installation is rated against impact criteria; when assessing the risk for IPPC (IED) installations examples of appropriate impact criteria include "Quantity/quality of water pollution".

Releases to water are therefore among the criteria identified to set priorities, and it is worth to mention how they are declined in the IRAM risk assessment:

4. Releases to water / off-site transport in waste water

Score	Definition
0	Activity **is not mentioned** in Annex 1 of the EPRTR Regulation and there are **no releases** to water or off-site transports in waste water
1	Activity **is mentioned** in Annex 1 of the EPRTR Regulation but **no threshold** of Annex 2, column 1b, is exceeded and there are **no other releases** to water or off-site transports in waste water
2	Activity **is or is not** mentioned in Annex 1 of the EPRTR Regulation, **no threshold** of Annex 2, column 1b, is exceeded but there are **other releases** to water or off-site transports in waste water
3	Activity **is mentioned** in Annex 1 of the EPRTR Regulation and **the sum** of the releases to water or off-site transports in waste water - normalised to the thresholds* of Annex 2, column 1b - is **>1**
4	Activity **is mentioned** in Annex 1 of the EPRTR Regulation and **the sum** of the releases to water or off-site transports in waste water - normalised to the thresholds* of Annex 2, column 1b - is **>5**
5	Activity **is mentioned** in Annex 1 of the EPRTR Regulation and **the sum** of the releases to water or off-site transports in waste water - normalised to the thresholds* of Annex 2, column 1b - is **>10**
* Ratio of release or off-site transport to threshold value	

9. Main results of the Survey

A survey has been handed out at the first stage of the project containing preliminary questions to MS about wastewater treatment. There have been 21 replies from 17 countries. There is no such situation in any MS that parameters of the quality of treated wastewater are stated only in law. In majority of cases (16 answers from 12 MS) parameters are stated both in law and in the permit. In 4 MS parameters are stated only in the permit. There are many different systems regulating the way that wastewater permits are issued. There are cases of permits that are issued by various authorities, both as regards the administrative area to which the body is responsible and the competence of authority.

Of all countries where the discharge conditions are defined both in the law and in the permit, in 9 MS (13 answers) the permit can specify more restrictive conditions than the law, and in 2 MS the permit can specify more and less restrictive conditions. In 2 MS the permit can not specify other than the law conditions. The reasons for having possibility of setting in the permit more or less restrictive conditions are as follows: in these cases (and they are particular not regular situations) permit conditions are related to the state of the receiving water body (lower water quality encompasses more restrictive conditions for wastewater discharged) or to the quality of the water used in the industrial processes (higher quality parameters for raw water includes higher quality parameters for wastewaters).

There are more reasons for possibly setting only more restrictive conditions in the permit than those prescribed by law, namely:

- Situation where special care must be given to recipient bodies which belongs to sensitive areas or other areas of environmental importance.
- In terms of requiring monitoring of parameters which are not specifically indicated in the law or impose stricter emission limit values.
- If best available techniques allow to attain smaller values and if facilities are located in specific delicate places.
- Conditions more restrictive than e.g. BREF/BAT conclusions if it is necessary regarding WFD, which is implemented in an executive order which again in turn must be implemented in the permit.
- If water quality standards are not met by applying BAT-AELs.

The permit determining the quality parameters of discharged wastewater (whether it is an IED or sector permit) is issued by the same authority that inspects the installation in 10 MS (12 answers). The permit is issued and inspected by different authorities in also 10 MS (12 answers). 2 MS (3 answers) occurred in these 2

groups. The reason is that in those 2 cases permit conditions can be checked both by the permitting authority and by a different one.

In the majority of the cases where permit is issued by the same authority than the one that check compliance, permit issues and check compliance is done by different departments or different group of people in one department or different team within the same authority or section who is checking compliance work and do research independent from the permitting section and management of both sections is different.

The advantages, which respondents of the survey indicated, of that system over the other, is that experts who perform inspection may have better knowledge about the facility and can monitor the environmental performance of the facility more effectively. When it's the same authority it provides an integrated approach and knowledge from the approval process is utilized in the inspection. Inspectors who write authorizations/permits know very well the operations and thus can effectively carry out their checks. This enables better handing over of the case files and continuous communication between permitting and compliance teams thereby facilitating mutual understanding of permit conditions and compliance issues such as enforceability. The authority who performs the inspections knows the conditions established in the permit and the complete administrative file of the activity. More knowledge and experience in one authority, more exchange of knowledge, better transfer of information.

The advantages of the system where the permit is issued by a different authority than the one that checks compliance of permit conditions is improving the transparency on the decisions and avoiding corruption. Disadvantages is that the permitting authority may not know the installation very well or, in some cases, might not even visit the installation at all. That system increases the need of communication between authorities which results in an amount of correspondence between authorities and extended time for writing permit. Notwithstanding, respondents indicated involving inspecting authorities into decision making main process as a good habit.

Analytical measurements of the discharged treated wastewater are conducted by the operator (itself or by hired third party laboratory), by the inspection authority (itself or by hired laboratory).

The operator is responsible for performing self-monitoring in all 16 MS (20 answers) who responded to the survey. Regarding countries where permit writing and inspection are different authorities, the operator is also responsible for sending results to the permitting authority in 8 MS (12 answers) and in 4 MS for sending results to the inspection authority. It means in 3 of those MS the operator is responsible to send results to both permitting authority and inspection authority. In 4 MS operators is responsible for sending results to permitting/inspection authority.

The inspection authority has a checklist to perform an inspection in an industrial wastewater treatment plant in 7 MS (11 answers). It can be either a dedicated/separate checklist or part of a complex checklist, checklist made individually for purpose of installation. The Inspection authority doesn't have a checklist in 8 MS. There are cases where inspection of the industrial wastewater treatment plant is included in the inspection of the whole industrial plant and no checklists are used but an agenda for the inspection. There are also cases where no such standard checklists exist and cases where specific checklists are prepared using the particular permit and making reference to previous on-site inspection before any inspection at such an installation.

Sampling and analysis should be performed by an accredited laboratory in every MS, but not in all cases not accredited sampling or not accredited measurements are treated as invalid. It might be some exceptions, although very rare or special approval has to be issued. In court that analysis or measurements could be easily challenged or just would be unacceptable. In some countries measurements or sampling without accreditation is the basis for issuing a decision imposing an administrative penalty.

	Only law	Only permit	Both	Permit can specify only more restrictive cond	Permit can specify more and less restrictive cond	No more no less	Permit issue authority = inspection	Permit issue authority ≠ inspection
Turkey			+			+	+	
Cyprus		+?	+	+			+	
Romania			+		+			+
Czech Republic			+	+			+	+
Denmark		+					+	
Estonia			+	+				+
Slovak Republic			+	+			+	
Slovenia			+			+		+
Finland		+						+
Portugal			+		+		+	+
Malta			+	+			+	
Spain			+	+				+

	Only law	Only permit	Both	Permit can specify only more restrictive cond	Permit can specify more and less restrictive cond	No more no less	Permit issue authority = inspection	Permit issue authority ≠ inspection
(Navarra)								
Spain (Galicia)			+	+			+	(+)
Spain (Castilla la Mancha)			+	+			+	
Spain (Cantabria)			+	+				+
Spain (Andalucia)			+	+	(+)		+	
Netherland		+					+	
Italy			+	+				+
Poland			+	+				+
Ireland		+			+		+	
Belgium (Walloon Region)		+				+		+

Annex 1: Checklist on wastewater treatment plant inspection

Introduction

This is an extensive draft checklist, so a selection of questions should be made previous to inspection. A part of the work required to cover all the reported information is a desk work.

The following check list has been divided in the following Parts:

PART 1: STANDARDIZED INFORMATION TO BE FACILITATED BY OPERATORS WHEN ACTUALISING A PERMIT

PART 2: ENVIRONMENTAL INSPECTION CHECKLIST FOR INDUSTRIAL WASTE WATER

PART 3: GENERAL REQUIREMENTS, ACCREDITATION LABORATORY AND METHODS

GENERAL INFORMATION ABOUT THE INSTALLATION

Date of inspection:	
Inspection typology:	*Routine or non-routine environmental inspections*
Installation:	
Address:	
IPPC category:	
n. of permit:	
IPPC referent:	
E-mail:	
Phone number:	

Part 1: Standardized information to be facilitated by operators when actualising a permit

This Part of the checklist is based on best available techniques (BAT) conclusions, under Directive 2010/75/EU of the European Parliament and of the Council, for common wastewater and waste gas treatment/management systems in the chemical sector (CWW BREF).

Permit authorities should ask operators to facilitate all the information in a standard form. In that way, inspector's verification task could be tuned up to detect possible non compliances.

Please note that the BAT may refer to the individual chemical production plant, to the individual wastewater streams from the plants or to individual pre-treatment plants. This implies that the assessment of BATs that do not refer to the combined effluent or the management of the whole chemical site has to be repeated for any individual point of reference. Before applying the check list, to avoid any misunderstanding, authorities should clarify the point of reference for the individual BATs with the operator.

In case BAT are legally implemented as General Binding Rules in respective national legislation, the check list may be modified to rather refer to the corresponding piece of national legislation.

Some of the BAT (e.g. BAT 12) ask to use an appropriate combination of techniques which does not necessarily mean to apply all of the named techniques. The checklist enables the assessment of the individual techniques; this step needs to be completed by an assessment of the applied combination.

COMMISSION IMPLEMENTING DECISION (EU) 2016/902 of 30 May 2016				
Establishing the Best Available Techniques (BAT) conclusions, under Directive 2010/75/EU of the European Parliament and of the Council, for common wastewater and waste gas treatment/management systems in the chemical sector				
	Compliance with BAT	**Yes**	**No**	**Data/ Remarks/ Explanations**
BAT	Transposed into national law	☐	☐	

1. Environmental management systems EMS				
BAT 1	In order to improve the overall environmental performance, BAT is to implement and adhere to an environmental management system (EMS) that incorporates all of the following features:			
	Compliance with BAT	**Yes**	**No**	**Data/ Remarks/ Explanations**
iv	**Implementation of procedures paying particular attention to:**			
	Certified by Independent Body • EMAS • ISO 14001	☐ ☐	☐ ☐	
f	Effective process control	☐	☐	
g	Maintenance programmes Maintenance of records	☐ ☐	☐ ☐	
h	Emergency preparedness and response	☐	☐	
i	Safeguarding compliance with environmental legislation	☐	☐	
v	**Checking performance and taking corrective action, paying particular attention to:**			
a	monitoring and measurement (see also the Reference Report on Monitoring of emissions to Air and Water from IED installations — ROM)	☐	☐	
d	Independent (where practicable) internal or external auditing in order to determine whether or not the EMS conforms to planned arrangements and has been properly implemented and maintained	☐	☐	

vii	Following the development of cleaner technologies	☐	☐	

BAT 2	In order to facilitate the reduction of emissions to water and the reduction of water usage, BAT is to establish and to maintain and inventory of wastewater as part of the environmental management system (see BAT 1), that incorporates all of the following features:			
	Compliance with BAT	**Yes**	**No**	**Data/ Remarks/ Explanations**
	Information about the chemical production processes, including:			
a	Chemical reaction equations, also showing side products	☐	☐	
b	Simplified process flow sheets that show the origin of the emissions	☐	☐	
c	Descriptions of process-integrated techniques and waste water/ treatment at source including their performances	☐	☐	
ii	**Information, as comprehensive as is reasonably possible, about the characteristics of the wastewater streams, such as:**			
a	Average values and variability of: • *flow,* • *pH,* • *temperature,* • *conductivity*	☐ ☐ ☐ ☐	☐ ☐ ☐ ☐	

b	Average concentration and load values of relevant pollutants/parameters and their variability • *(e.g. COD/TOC,* • *nitrogen species,* • *phosphorus,* • *metals,* • *salts,* • *specific organic compounds)*	☐ ☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐ ☐	
c	Data on bio eliminability *(e.g. BOD, BOD/COD ratio, Zahn-Wellens test, biological inhibition potential (e.g. nitrification))*	☐	☐	

2. Monitoring				
BAT 3	For relevant emissions to water as identified by the inventory of wastewater streams (see BAT 2), BAT is to monitor key process parameters (including continuous monitoring of wastewater flow, pH and temperature) at key locations (e.g. influent to pre-treatment and influent to final treatment			
	Compliance with BAT	**Yes**	**No**	**Data/ Remarks/ Explanations**
a	Process parameters	☐	☐	

BAT 4	BAT is to monitor emissions to water in accordance with EN standards with at least the minimum frequency given below. If EN standards are not available, BAT is to use ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality.			
	Compliance with BAT	**Yes**	**No**	**Data/ Remarks/ Explanations**
a	Daily (*TOC / DOD / CSS / TN / N_{inorg} / TP)*	☐	☐	
b	Monthly *(AOX / Metals)*	☐	☐	

c	Toxicity *(To be decided based on a risk assessment, after an initial characterization)*	☐	☐	

3. Emissions to water				
3.1.	**Water usage and wastewater generation**			
BAT 7	In order to reduce the usage of water and the generation of waste water, BAT is to reduce the volume and/or pollutant load of wastewater streams, to enhance the reuse of wastewater within the production process and to recover and reuse raw materials.			
	Compliance with BAT	**Yes**	**No**	**Data/ Remarks/ Explanations**
a	Reduce the volume and/or pollutant load of wastewater streams	☐	☐	
b	Enhance the reuse of wastewater within the production process	☐	☐	
c	Recover and reuse raw materials	☐	☐	

3.2	**Wastewater collection and segregation**			
BAT 8	In order to prevent the contamination of uncontaminated water and to reduce emissions to water, BAT is to segregate uncontaminated wastewater streams from wastewater streams that require treatment.			
	Compliance with BAT	**Yes**	**No**	**Data/ Remarks/ Explanations**
a	Channel segregation system	☐	☐	

BAT 9	In order to prevent uncontrolled emissions to water, BAT is to provide an appropriate buffer storage capacity for wastewater incurred during other than normal operating conditions based on a risk assessment (taking into account e.g. the nature of the pollutant, the effects on further treatment, and the receiving environment), and to take appropriate further measures (e.g. control, treat, reuse).			
	Compliance with BAT	**Yes**	**No**	**Data/ Remarks/ Explanations**
a	Appropriate buffer storage capacity for wastewater	☐	☐	

3.3	**Wastewater treatment**			
BAT 10	In order to reduce emissions to water, BAT is to use an integrated wastewater management and treatment strategy that includes an appropriate combination of the techniques in the priority order given below.			
	Compliance with BAT	**Yes**	**No**	**Data/ Remarks/ Explanations**
a	Process-integrated techniques	☐	☐	
b	Recovery of pollutants at source	☐	☐	
c	Wastewater pre-treatment	☐	☐	
d	Final wastewater treatment	☐	☐	

3.3.1	**Wastewater pre-treatment**			
BAT 11	In order to reduce emissions to water, BAT is to pre-treat wastewater that contains pollutants that cannot be dealt with adequately during final wastewater treatment by using appropriate techniques.			
	Compliance with BAT	**Yes**	**No**	**Data/ Remarks/ Explanations**
a	Pre-treatment to protect the final wastewater treatment plant *(e.g. protection of a biological treatment plant against inhibitory or toxic compounds)*	☐	☐	

b	Pre-treatment to remove compounds that are insufficiently abated during final treatment *(e.g. toxic compounds, poor- ly/non-biodegradable organic com- pounds, organic compounds that are pre- sent in high concentrations, or metals during biological treatment)*	☐	☐	
c	Pre-treatment to remove compounds that are otherwise stripped to air from the collection system or during final treatment *(e.g. volatile halogenated organic com- pounds, benzene)*	☐	☐	
d	Pre-treatment to remove compounds that have other negative effects *(e.g. corrosion of equipment; unwanted reaction with other substances; contamination of wastewater sludge)*	☐	☐	
e	Is the pre-treatment as close as possible to the source in order to avoid dilution, in particular for metals	☐	☐	

3.3.2	**Final wastewater treatment**			
BAT 12	In order to reduce emissions to water, BAT is to use an appropriate combination of final wastewater treatment techniques.			
	Compliance with BAT	**Yes**	**No**	**Data/ Remarks/ Explanations**
	Preliminary and primary treatment			
a	Equalisation	☐	☐	
b	Neutralisation	☐	☐	

c	Physical separation *(e.g. screens, sieves, grit separators, grease separators or primary settlement tanks)*	☐	☐	
	Biological treatment (secondary treatment)			
d	Activated sludge process	☐	☐	
e	Membrane bioreactor	☐	☐	
	Nitrogen removal			
f	Nitrification/denitrification	☐	☐	
	Phosphorus removal			
g	Chemical precipitation	☐	☐	
	Final solids removal			
h	Coagulation and flocculation	☐	☐	
i	Sedimentation	☐	☐	
j	Filtration *(e.g. sand filtration, microfiltration, ultrafiltration)*	☐	☐	
k	Flotation	☐	☐	

3.4	**BAT-associated emission levels for emissions to water** *(applying at the point where the emission leaves the installation)*			
	The BAT-associated emission levels (BAT-AELs), for emissions to water given in Table 1, Table 2 and Table 3 apply to direct emissions to a receiving water body from:			
	Compliance with BAT	**Yes**	**No**	**Data/ Remarks/ Explanations**
i	The activities specified in Section 4 of Annex I to Directive 2010/75/EU	☐	☐	

ii	Independently operated wastewater treatment plants specified in Section 6.11 of Annex I to Dir. 2010/75/EU provided that the main pollutant load originates from activities specified in Section 4 of Annex I to Dir. 2010/75/EU	☐	☐	
iii	The combined treatment of wastewater from different origins provided that the main pollutant load originates from activities specified in Section 4 of Annex I to Dir. 2010/75/EU	☐	☐	

	BAT-AELs for direct emissions of TOC, COD and TSS to a receiving water body			
	Compliance with BAT (yearly average)	**Yes**	**No**	**Data/ Remarks/ Explanations**
a	Total organic carbon (TOC) = 10-33 mg/l[2] *(The BAT-AEL applies if the emission exceeds 3,3 t/yr)*	☐	☐	
b	Chemical oxygen demand (COD) = 30-100 mg/l *(The BAT-AEL applies if the emission exceeds 10 t/yr)*	☐	☐	
c	Total suspended solids (TSS) = 5,0-35 mg/l (*The BAT-AEL applies if the emission exceeds 3,5 t/yr)*	☐	☐	

[2] The BATc allows for higher concentration levels under certain conditions.

	BAT-AELs for direct emissions of nutrients to a receiving water body			
	Compliance with BAT (yearly average)[3]	**Yes**	**No**	**Data/ Remarks/ Explanations**
a	Total nitrogen (TN) = 0,20-1,0 mg/l *(The BAT-AEL applies if the emission exceeds 2,5 t/yr)*	☐	☐	
b	Total inorganic nitrogen (N_{inorg}) = 5,0-20 mg/l *(The BAT-AEL applies if the emission exceeds 2,0 t/yr)*	☐	☐	
c	Total phosphorus (TP) = 0,50-3,0 mg/l *(The BAT-AEL applies if the emission exceeds 300 kg/yr)*	☐	☐	
	BAT-AELs for direct emission of AOX and metals to a receiving water body[4]			
	Compliance with BAT	**Yes**	**No**	**Data/ Remarks/ Explanations**
a	Adsorb able organically bound halogens (AOX) = 0,20-1,0 mg/l *(The BAT-AEL applies if the emission exceeds 100 kg/yr)*	☐	☐	

[3] BAT-AEL for TN and N inorg only applies to the effluents from biological treatment plants.

[4] There are several exemptions in the BATc of the CWW BREF which need to be considered.

b	Chromium (expressed as Cr) = 5,0-25 µg/l *(The BAT-AEL applies if the emission exceeds 2,5 kg/yr)*	☐	☐	
c	Copper (expressed as Cu) = 5,0-50 µg/l *(The BAT-AEL applies if the emission exceeds 5,0 kg/yr)*	☐	☐	
d	Nickel (expressed as Ni) = 5,0-50 µg/l *(The BAT-AEL applies if the emission exceeds 5,0 kg/yr)*	☐	☐	
e	Zinc (expressed as Zn) = 20-300 µg/l *(The BAT-AEL applies if the emission exceeds 30 kg/yr)*	☐	☐	

4. Waste				
BAT 14	In order to reduce the volume of wastewater sludge requiring further treatment or disposal, and to reduce its potential environmental impact, BAT is to use one or a combination of the techniques given below.			
	Compliance with BAT	**Yes**	**No**	**Data/ Remarks/ Explanations**
a	Chemical conditioning *(i.e. adding coagulants and/or flocculants) or thermal conditioning (i.e. heating) to improve the conditions during sludge thickening/dewatering.*	☐	☐	

b	Thickening *(can be carried out by sedimentation, centrifugation, flotation, gravity belts, or rotary drums. Dewatering can be carried out by belt filter presses or plate filter presses).*	☐	☐	
c	Sludge stabilisation *(includes chemical treatment, thermal treatment, aerobic digestion, or anaerobic digestion).*	☐	☐	
d	Drying *(Sludge is dried by direct or indirect contact with a heat source).*	☐	☐	

5. Emissions to air				
5.1.	**Waste gas collection**			
BAT 15	In order to facilitate the recovery of compounds and the reduction of emissions to air, BAT is **to enclose the emission sources** and to treat the emissions, where possible.			
	Compliance with BAT	**Yes**	**No**	**Data/ Remarks/ Explanations**
	Emission sources enclosed	☐	☐	

BAT 6	BAT is to periodically **monitor odour** emissions from relevant sources in accordance with EN standards.			
	Compliance with BAT	**Yes**	**No**	**Data/ Remarks/ Explanations**
a	Dynamic olfactometry according to EN 13725	☐	☐	

BAT 21	In order to prevent or, where that is not practicable, to reduce odour emissions **from wastewater collection** and treatment and from sludge treatment, BAT is to use one or a combination of the techniques given below:			
	Compliance with BAT	**Yes**	**No**	**Data/ Remarks/ Explanations**
i	Minimise residence times	☐	☐	
ii	Chemical treatment	☐	☐	
iii	Optimise aerobic treatment			
a	Controlling the oxygen content	☐	☐	
b	Frequent maintenance of the aeration system	☐	☐	
c	Use of pure oxygen	☐	☐	
d	Removal of scum in tanks	☐	☐	
v	**End-of-pipe treatment**	☐	☐	
a	biological treatment	☐	☐	
b	thermal oxidation	☐	☐	

Part 2: Environmental inspection checklist for industrial wastewater

This checklist has been divided in the following sections:

- Installation Permits.
- Wastewater streams origin and pollution characteristics.
- Sewer network.
- Wastewater treatment.
- Cooling / steam water.
- Rain water.
- Changes in last 3 years.
- Monitoring Plan Compliance.
- Operating instructions.
- Malfunctions and accidents prevention and correction measures.
- Reporting.

1. Installation Permits				
	Questions	**Yes**	**No**	**Data / Comments / Explanations**
1.1	Activity permit ?	☐	☐	
1.2	Construction stage permit	☐	☐	
1.3	Discharge permit	☐	☐	
1.4	Sewer nets permit	☐	☐	
1.5	Does the entity have formal regulations for the introduction of wastewater into the environment?	☐	☐	

2.	Wastewater streams origin and pollution characteristics (BAT 2, 8)			
	Questions	**Yes**	**No**	**Data / Comments / Explanations**
2.1	Identify the **processes** that produce industrial discharges	☐	☐	
2.2	Identify **Relevant Pollutants** produced in the industrial process	☐	☐	
2.3	Verify if there is any emergency **bypass**	☐	☐	
2.4	Is there consistence between total water consumption and total waste water?	☐	☐	
2.5	Check if the organization is authorized to treat the discharge of water coming from a different installation.	☐	☐	

Table of Wastewater streams origin and pollution characteristics *(BAT 2, 8)*				
Wastewater partial streams	**Treatment**	**Amount m^3/yr.**	**Relevant pollutants and annual load**	**Verification Remarks**
Production wastewater				
Cleaning Wastewater				
Sanitary wash water				
Polluted rain water				
Cooling / steam water				
Rain water				
Total waste water:m3/yr				

3.	Sewer network (BAT 8, 9)			
	Questions	**Yes**	**No**	**Data / Comments / Explanations**
3.1	Map of water discharge pipelines with control points. **Sewer system, pipelines and points of discharge** correspond to the description and map of installations? *(e.g. shaft constructions, culverts, wastewater pumps, flood pumps, pressure pipes without pressure network, installations in pressure and vacuum dewatering networks, rainwater drainage systems, rainwater drainage systems, rainwater drainage systems, rainwater drainage systems, rainwater drainage basins)*	☐	☐	
3.2	Is there any preventive system for rainwater accumulation?	☐	☐	

4. Wastewater treatment (BAT 11, 12, 13)				
	Questions	**Yes**	**No**	**Data / Comments / Explanations**
4.1	Flow chart (data sheet) of water discharges	☐	☐	
4.2	Bypass, discharges without established treatment, dilution, areas without treatment. Was any of these detected during inspection?	☐	☐	
4.3	**Treatment systems.** Indicate which kind of treatment plant:			
	1. Batch system, continuous system	☐	☐	
	2. Sedimentation	☐	☐	
	3. Anaerobic stage	☐	☐	
	4. Nitrification	☐	☐	
	5. Denitrification	☐	☐	
	6. Intermediate clarification	☐	☐	
	7. Elimination	☐	☐	
	8. Filtration	☐	☐	
	9. Separators	☐	☐	
	10. Neutralization	☐	☐	
	11. Oxidation	☐	☐	
	12. Boiling	☐	☐	
	13. Flocculation / precipitation	☐	☐	
	14. Stripping	☐	☐	
	15. Ion exchange	☐	☐	
	16. Reverse osmosis	☐	☐	
	17. Membrane filtration	☐	☐	
	18. Sludge treatment	☐	☐	
	19. Thickening	☐	☐	
	20. Sludge drying	☐	☐	
	.....			

4.4	Treatment plant 1	☐	☐	
4.5	Treatment plant 2	☐	☐	
4.6	• Treatment systems and devices are operative. • Integrity of the sewage pipelines through video inspection.	☐ ☐	☐ ☐	

5. Cooling / steam water				
	Questions	**Yes**	**No**	**Data / Comments / Explanations**
5.1	Identify chemical characteristics of cooling water source	☐	☐	
5.2	• Select feasible cooling water treatment (chemical composition) using less hazardous chemicals or chemicals that have lower potential for impact on the environment. • Apply less corrosion-sensitive material/analysis of corrosiveness of process substance as well as of cooling water to select the right material.	☐ ☐	☐ ☐	
5.3	Optimize dosage regime by monitoring of cooling water and systems conditions	☐	☐	

6.	**Rain water**			
	General location data:			
	Questions	Yes	No	Data / Comments / Explanations
6.1	Does rainwater accumulate?	☐	☐	If so, classification of rainwater according approval regarding pollution ☐unloaded (class I) ☐low loaded (class II) ☐high loaded(class III)
6.2	Discharging rainwater together with wastewater? e.g. 1. Drainage water 2. Mixed water discharge (acc. State of the technique) 3. Cooling water 4. Wastewater from steam generation, inorganic weakly contaminated or treated wastewater 5. Other	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐	
6.3	Rainwater treatment available? e.g. 1. Oil separator 2. Rain clarifier 3. Rainwater retention basin 4. Storage space canals 5. Seepage wells 6. Rigolets 7. Seepage shafts 8. Other	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐	If so, which one?
6.4	Treatment plant 1	☐	☐	
6.5	Treatment plant 2	☐	☐	

7. Changes in last 3 years				
n.	**Question/Compliance**	**Yes**	**No**	**Data/ Remarks/ Explanations**
7.1	Have there been changes in technology or installations?	☐	☐	
7.2	Have any changes in procedures or auxiliary materials?	☐	☐	
7.3	Have the changes been reported to the competent authority?	☐	☐	
7.4	Does exist a procedure to manage changes	☐	☐	
7.5	Changes verified:	☐	☐	

8. Monitoring Plan Compliance (BAT 3, 4, 5, 6, 12) - As in Integrated Environmental Authorisation							
[1] **Kind of Wastewater**	[2] *Treatment*	Discharges and control points			[4] Monitoring Plan		
		[3] receiver	X	Y	Parameters	Periodicity	By Who?

[1] Industrial / domestic like /industrial rain water / rain water / Also indicate possible monitoring in basin waters.
[2] Yes / No *(Treatment explanation further).-*
[3] Public sewage /Private sewage / River basin /lake basin / Sea basin
[4] Control plan as established in permit

Check compliance since last inspection (<3 years)				
n.	**Question/Compliance**	**Yes**	**No**	**Data/ Remarks/ Explanations**
8.1	• Is self-monitoring done correctly? • Are the monitoring values complied?	☐	☐	
8.2	Is the prescribed frequency of inspections acc. the relevant installation complied? (e.g. secondary determinations)	☐	☐	

8.3	Characteristics of control point, in particular the accessibility of the operator and instruments	☐	☐	
8.4	Were measurements and determination of characteristic data carried out acc. prescribed procedures or equivalent ones?	☐	☐	
8.5	Are necessary devices and measuring instruments available to determinate characteristic data acc. to the approval conditions?	☐	☐	
8.6	What are the specifications for periodical maintenance of the measuring devices? Where is the maintenance handling documented?	☐	☐	
8.7	Was the verification of measuring accuracies carried out acc. the approval?	☐	☐	
8.8	Is the amount of wastewater discharged into the environment complies with the permit conditions?	☐	☐	
8.9	Are necessary equipment and measuring devices available to monitor the operating conditions of the permit?	☐	☐	
8.10	Are the quality measurements of discharged wastewater carried out at the frequency specified in the permit?	☐	☐	
8.11	Are the monitoring values (of the last 3 years) complying with Admissible Emission Levels?	☐	☐	
8.12	Measuring devices accuracies are verified periodically?			

8.13	Are measuring instruments connected to a permanently occupied measuring room?	☐	☐	
8.14	Is the sampling performed by an operator who has a quality management system certificate? or automatically by a metrological sampler?	☐	☐	
8.15	Sample analysis are made by a laboratory covered by a quality management system certificate and accredited for all tested pollutants?	☐	☐	

9.	**Operating instructions (BAT 1, 3, 7)**			
	Questions	**Yes**	**No**	**Data / Comments / Explanations**
9.1	Aspects considered in written operating instructions of the installation	☐	☐	
9.2	Supervisor of the technological process of the treatment plant and maintenance of the cleaning equipment?	☐	☐	
9.3	Are operating instructions available?	☐	☐	
9.4	Does the supervision of the correct operation of the treatment plant cover all the parameters specified in the water permit?	☐	☐	
9.5	Verify if there are monitoring systems that control the flow, the mode of maintenance/calibration, and the recording of those items.	☐	☐	

9.6	Is an operating journal available (possibly digital)? Can the operating journal be viewed retro-actively for 3 years? Have been special operating conditions entered into the operating journal?	☐	☐	
9.6	Are cases of exceedance of admissible levels recorded?	☐	☐	
9.7	Are there procedures for calibrating and maintaining measuring equipment?	☐	☐	
9.8	• Are existing regulations on maintenance, control, self-monitoring etc. considered? • Where are these regulations documented? • Are the maintenance, controls and measurements carried out and documented by the operator?	☐	☐	
9.9	Was the staff trained periodically?	☐	☐	
9.10	What are the specifications for periodical maintenance of the measuring devices? and how it is handled an emergency bypass	☐	☐	

10. MALFUNCTIONS AND ACCIDENTS PREVENTION AND CORRECTION MEASURES (BAT 17, 9)				
n.	**Question/Compliance**	**Yes**	**No**	**Data/ Remarks/ Explanations**
10.1	• Have malfunctions occurred since the last monitoring? • Have any contaminations occurred in the water body during the malfunctions?	☐ ☐	☐ ☐	
10.2	• Are sufficient retention capacities in case of malfunctions available? • What precautions have been taken to avoid repetitions?	☐ ☐	☐ ☐	
10.3	Which way ensures that malfunctions of the wastewater treatment plant are promptly reported to the competent authority	☐	☐	
10.4	Are the parameters of the treatment plant specified in certain intervals (maximum / minimum) and connected to the alarms?	☐	☐	
10.5	Are there procedures to remove irregularities if admissible (acceptable?) levels are exceeded?			

11. Reporting				
n.	**Question/Compliance**	**Yes**	**No**	**Data/ Remarks/ Explanations**
11.1	Is the responsible of wastewater treatment plant reported to the environmental protection authority?	☐	☐	
11.2	Are the results of monitoring of quality and quantity of discharged wastewater submitted to the environmental protection authority on the correct forms and deadlines?	☐	☐	
11.3	Have the malfunctions /incidents been reported to the competent authority? Declaration of conformity by operator	☐ ☐	☐ ☐	

12. Severe weather conditions				
n.	**Question/Compliance**	**Yes**	**No**	**Data/ Remarks/ Explanations**
12.1	Does the EMS contain procedures to tackle severe weather conditions ?	☐	☐	
11.2	Is the installation equipped with storm tanks and pumping system to tackle severe rainwater conditions?	☐	☐	
11.3	Is an Emergency discharging system present in the installation? How often has it been opened to discharge untreated wastewater due to severe rainwater conditions?	☐	☐	

Part 3: General requirements, accreditation laboratory and methods

The purposes of this Part of checklist is to specify general requirements national and international and the criteria used in the assessment of laboratory and methods.

The general criteria for accreditation of laboratories are found in ISO/IEC 17025-2005, General requirements for the competence of testing and calibration laboratories.

The main benefits of Accreditation are:

- Formal recognition of competence of a laboratory by reputed accreditation body in accordance with international criteria.
- Better control of laboratory operations and feedback to system and are technically competent.
- Increase of confidence in testing/calibration data and personnel performing work.
- Savings in terms of time and money due to reduction or elimination of the need for re-testing of products.
- Potential increase in business due to enhanced customer confidence and satisfaction.

Main definitions

Accuracy: A measure of the degree of conformity of a value generated by a specific procedure to the assumed or accepted true value and includes precision and bias.

Audit: A systematic and independent examination to determine whether quality activities and related results comply with planned arrangements and whether these arrangements are implemented effectively and are suitable to achieve objectives.

Bias: The difference between the expectation of the test results and an accepted reference value.

Calibration: Comparison and adjustment to a standard of known accuracy. The set of operations which establish, under specific conditions, the relationship between values of quantities by a measuring instrument or measuring system, or values represented by a material measure or a reference material, and the corresponding values realized by standards

Limit of quantitation (LOQ): Defined from a regulatory perspective as the lowest concentration tested and quantified such that an unambiguous identification of the analyte can be proven and at which an acceptable mean recovery with an acceptable relative standard deviation (RSD) is obtained

Method: A document that provides detailed “how to” instructions to accomplish a task.

Method validated: A method whose performance characteristics (selectivity and specificity, range, linearity, sensitivity, ruggedness, accuracy and precision and quantitation and detection limits) meet the specifications related to its intended use.

Quality Assurance: All those planned and systematic actions necessary to provide adequate confidence that a product or service will satisfy **given requirements for quality.**

Quality Control: The operational techniques and activities that are used to fulfil requirements for quality.

Quality System: The organizational structure, responsibilities, procedures, processes and resources for implementing quality management.

Requirements				
n.	**Question/Compliance**	**Yes**	**No**	**Data/ Remarks/ Explanations**
12.1	OVERVIEW OF LABORATORY QUALITY SYSTEM • Is the laboratory accredited • Is the documentation of quality system based on the requirements of ISO 17025?	☐ ☐	☐ ☐	
12.2	LABORATORY MANAGEMENT Are the methods for analysis of parameters of interest accredited?	☐	☐	
12.3	Are there a nominated manager who are suitably qualified and experienced? Is the suitably qualified quality control manager responsible for all quality control activities in the laboratory?	☐ ☐	☐ ☐	

12.4	STAFF COMPETENCY Is the laboratory manager supported by an adequate number of qualified staff, trained in the principles and practice of relevant areas of analysis? Is a training procedure in place for laboratory staff? (These procedures should cover both analytical procedures and the relevant principles and practice of analysis, including calibration and internal and external analytical quality control)	☐ ☐	☐ ☐	
12.5	Does the quality manager conduct audits to assess compliance with systems and methods?	☐	☐	
12.6	EQUIPMENT&CALIBRATION Is a documented calibration program in place for all necessary equipment? (As well as major pieces of instrumentation this should include all laboratory items e.g. pipettes, ovens) Are calibration records current for all equipment and maintained on file?	☐	☐	
12.7	Is a documented maintenance program in place in accordance with manufactures/suppliers' recommendations for equipment utilized?	☐	☐	

12.8	OVERVIEW OF ANALYTICAL METHODS • Are documented standard operating procedures in place for each test method? • Are all relevant procedures based on reference standard methods (as defined in the licence)? • Is a copy of relevant standard available on-site?	☐ ☐ ☐	☐ ☐ ☐	
12.9	INTERNAL QUALITY CONTROL Does the Laboratory have a documented internal quality control procedure in place? Are AQC subject to evaluation (are Charts maintained, are action taken up on failure)?	☐	☐	
12.10	EXTERNAL QUALITY CONTROL Is the laboratory a participant in a laboratory proficiency scheme?	☐	☐	
12.11	METHOD VALIDATION Is a written methodology in place to determine the performance characteristics of test methods under the following headings? • Limit of Quantitation • Accuracy • Precision • Uncertainty of measurement • Range &Linearity System Suitability	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐	

12.12	ENVIRONMENTAL CONDITIONS • Is the laboratory ventilated to reduce the levels of contamination. • Is the laboratory tested to control humidity and temperature and work space temperature and test humidity are monitored. *The recommended relative humidity in the test area is 45-50% RH and the temperature in the test area is 20-25°C.*	☐ ☐	☐ ☐	

Annex 2: Answers to the survey

MEMBER STATE	ORGANIZATION	DRAFTER	ROLE OF THE DRAFTER
The Netherlands	Ministry of Infrastructure and the Environment	David Vroon	Advisor/consultant industrial discharge permits
Turkey	Ministry of Environment and Urbanization Of Turkey	Şenay Arslan	Inspector
Romania	National Environmental Guard	Florin Homorean	Commissar (inspector)
Cyprus	Department of Environment	Chrystalla Stylianou	Head of the Water and Soil Pollution Control Sector
Czech rep.	Czech environmental inspectorate	Tomáš Augustin	Environmental inspections coordinator
Denmark		Mette Lumbye Sørensen	
Estonia		Silva Prihodko	
Slovak Republic	The Slovak Environmental Inspectorate (SEI)	Peter Šimurka	Head Inspector
Slovenia	Inspectorate of the Republic of Slovenia for the Environment and Spatial Planning	Vladimir Kaiser	Director of the environmental inspection
Finland	Centre for Economic Development, Transport and the Environment for Southeast Finland	Jaakko Vesivalo	Head of Unit
Malta	Environment & Resources Authority	Simon Farrugia	Senior Officer (Environmental Permitting)
Spain (Navarra)	Departamento de Desarrollo Rural, Medio Ambiente y Administración Local	Juan Pablo Belzunegui Otano	Inspector
Spain (Castilla La Mancha)	Ministry of Environment and Spatial Planning. Regional Government of Castilla La Mancha	Olga Villegas Sánchez	Inspection
Spain (Cantabria)	Cantabria's Government	Patricia Portilla Malfaz	Inspector of Installations with Environmental Integrated Authorization
Spain (Andalucia)	Regional Environment Ministry of Andalucía	Luis G. Viñas Bosquet	Planning and Management of Hydraulic Public Domain Sub-Director

Spain (Galicia)	Ministry of Environment, Spatial Planning and Infrastructures of the Regional Government of Galicia	Iñaki Bergareche	Environmental Inspector
Portugal	IGAMAOT	Roberto Valadares	Senior Inspector
Poland	Chief Inspectorate for Environmental Protection	Małgorzata Budzyńska	Senior Specialist
Italy	Sardinian Regional Environmental Protection Agency (ARPAS) - ISPRA	Romano Ruggeri - Roberto Borghesi	Environmental inspector
Ireland	Environmental Protection Agency (EPA) Ireland	Martin O'Reilly	Enforcement Inspector (inspections)
Belgium (Walloon region)	Agriculture, natural Resources and Environment operational general Directorate	Olivier Dekyvere	Environmental inspector

QUESTION1: PERMIT

Are parameters of the quality of treated wastewater stated in law? In permit? Other way? How?

TURKEY	Defined in Bylaw and in permit. Also by special provision and communiques. (e.g. some communiques for sampling, analyzing, wastewater treatment, sensitive regions, and some kind of industrial wastewater control.)
CYPRUS	The parameters of the quality of treated wastewater are stated in the Permit. If the treated wastewater is discharged to the recipient water body or soil, parameters are laid down in the Waste Discharge Permit or in the Industrial Emission Permit if the installation falls under the provisions of the IED.
ROMANIA	The quality parameters for wastewater are stated both in the law (Government Decision) and in the permit. By the Government Decision no 188/2002 is established maximum allowed concentration for many quality parameters; these maximum concentrations differ on the place of discharge (municipal sewerage or directly to a water body, e.g. river). By the permit are set maximum allowed concentration for specific parameters that characterise the waste waters from a certain installation.
CZECH REPUBLIC	In legislation and In permit
DENMARK	If the wastewater is discharged to the recipient it's part of the permit. Are the wastewater discharged to public wastewater treatment plants it's regulated in a permission granted by the municipality. The permit is either approved by the state or municipality depending om the type of industry.
ESTONIA	In law and in permit.
SLOVAK REPUBLIC	Yes. In law – Water Act, BAT Conclusions. In permit
SLOVENIA	Both in law (actually it is a decree) and in permit.
FINLAND	In permit
PORTUGAL	The limit values are established in the water permit that is autonomous and included as one annex of the environmental permit on IPPC installations. The law states also quality parameters for wastewater on non-IPPC installations, that are included on the water permit also.
MALTA	They are always specified in permit and based on national guidance documents and legislation such as the Water Policy Framework Regulations LN 194 of 2004 as amended transposing the Water Framework Directive (WFD) and related legislation. Moreover, consideration is taken on the type of activity being carried out and the nature of the effluent generated by the specific process within the installation which may require the monitoring of additional parameters. The parameters identified as requiring monitoring from a specific installation are included as part of the permit together with the associated emission limit vales, frequency of testing and reporting requirements.

SPAIN (NAVARRA)	Some parameters are specifically stated in permit. This parameters must be periodically controlled according to permit. General parameters are stated in law. This must be controlled only if there is any problem or question which forces its analysis, but in a general way must be attained
SPAIN (GALICIA)	In permit. If the treated wastewater is discharged to the recipient body, parameters are laid down in the permit, either in the integrated environmental permit (IEP) in IPPC/IED installations or in the specific discharge permit issued by the Water Authority at basin level in non IPPC/IED installations. IEPs are issued by Regional authorities.
SPAIN (CASTILLA LA MANCHA)	If the wastewater destination is the municipal network the limits are stated by the city council. If the wastewater destination is the river the limits are stated by the national government.
SPAIN (CANTABRIA)	The parameters of quality of treated wastewater are stated in law, in the Stated legislation for Public domain hydraulic (mainly rivers) and by the autonomous community of Cantabria legislation for waters of discharge to collector or coast. The representative parameters are established in permits and could be more restrictive than law. These permits established the controls and analysis that should be done.
SPAIN (ANDALUCIA)	Both, in law -european, national and regional-, and in permits. The main applicable legislation (non-exhaustive list) are the following: National law: • Real Decreto Legislativo 1/2001, de 20 de julio, por el que se aprueba el texto refundido de la Ley de Aguas. • Real Decreto 849/1986, de 11 de abril, por el que se aprueba el Reglamento del Dominio Público Hidráulico, que desarrolla los títulos preliminar I, IV, V, VI y VII de la Ley 29/1985, de 2 de agosto, de Aguas. Regional law: • Ley 9/2010, de 30 de julio, de Aguas para Andalucía. • Decreto 109/2015, de 17 de marzo, por el que se aprueba el Reglamento de Vertidos al Dominio Público Hidráulico y al Dominio Público Marítimo-Terrestre de Andalucía. European law: • Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy. Best Available Techniques (BAT) reference documents (BREFs)
NETHERLAND	For bigger installations/plants in individual permits. They are based on BAT-AELs, stated in the BREFs. Smaller installations/plants sometimes have general binding rules (specific parameters) for the quality of the treated waste water. They are also based on BAT-AELs.
ITALY	Both in low and in permits. The National Decree n.152/06 establishes maximum allowed concentration for water discharge into water bodies and sewage.
POLAND	Both in low and in permits
IRELAND	Yes in the permit. Emission limit values (ELVs) are outlined in the permits schedule. Enabling conditions specify the interpretation of the ELVs such as composite versus grab samples,

	allowable number of exceedances (8 out of 10 consecutive samples) etc.
BELGIUM	The parameters of the quality of wastewater discharge are stated in the permit. Sometimes, sectorial conditions set some emission limit values for wastewater discharge. In some cases, plant manager has to build a water treatment plant to reach the emission limit values.

QUESTION 2: PERMIT

Can permit specify more / less restrictive discharge conditions than law?

TURKEY	No, not in permit. But in some region, more strict discharged water quality standards are defined by special provision than in bylaw according to receiving water body pollution level
ROMANIA	In some specific cases the conditions established throughout the permit can be more or less restrictive than the condition established by law. In these particular cases the permit conditions are related to the state of the recipient water body (lower water quality than more restrictive conditions for wastewater discharged) or to the quality of the water used in the industrial processes (higher quality parameters for raw water than higher quality parameters for waste waters).
CYPRUS	Yes. The Permit can specify more restrictive discharge conditions than law in the cases where special care must be given to recipient bodies where belonging to sensitive areas or other areas of environmental importance.
CZECH REPUBLIC	Permit can specify more restrictive discharge conditions than law and can not specify less restrictive discharge conditions than law
DENMARK	There must always be a legal basis for the condition. But the condition can be more restrictive than e.g. BREF/ BAT-conclusions if it is necessary regarding WFD, which is implemented in an executive order which again in turn must be implemented in the permit.
ESTONIA	More restrictive discharge condition are in the permit
SLOVAK REPUBLIC	Permit can specify more restrictive discharge conditions than law and can not specify less restrictive discharge conditions than law.
SLOVENIA	No
FINLAND	The discharge conditions are set in the permit only.
PORTUGAL	The permit can establish its own values. Usually they are the same that the ones on the law.
MALTA	Yes the permit may specify more restrictive discharge conditions than those prescribed by law in terms of requiring monitoring of parameters which are not specifically indicated in law or impose stricter emission limit values.
SPAIN (NAVARRA)	Yes if Best Available Techniques allow to attain smaller values and also if facilities are located in specific delicate places.
SPAIN (GALICIA)	Yes In some basins' Management Plans, more restrictive discharge conditions than in law are laid down. Water quality conditions for the recipient body may lead also to more restrictive discharge

	conditions.
SPAIN (CASTILLA LA MANCHA)	More restrictive limits can be stated in the permits by the government (city council or national government). Less restrictive limits cannot be stated.
SPAIN (CANTABRIA)	Yes, the permit can be more restrictive but not less restrictive than law.
SPAIN (ANDALUCIA)	Yes, permits can specify more restrictive discharge conditions than law. Conditions less restrictive than law only can be specified by permits in justified cases.
NETHERLAND	More restrictive: Possible if water quality standards are not met by applying BAT-AELs. Less restrictive: Possible if there are good reasons for derogation (e.g. specific production not mentioned in BREFs)
ITALY	IED permits can fix more restrictive threshold limits at the discharging point, according to the site-specific situation of the water body receptor (e.g. quality of the water of the river).
POLAND	Yes, more restrictive.
IRELAND	More restrictive emission limit values may be specified in scenarios where the assimilative capacity of the receiving water body dictates that they are required or where the discharge is entering a designated area such as a special area of conservation etc. Less restrictive emission limit values are only allowed under derogations in line with legislation and are only for a short period of time to allow for the installation of treatment technologies to comply with stricter limits.
BELGIUM	Parameters of the quality of treated wastewater are not stated in law. Discharge conditions are set according to the receiving environment: sewer or river. If the receiving environment is a sewer, the public operator for wastewater treatment plant can set discharge conditions more or less restrictive than sectorial conditions. If the receiving environment is a river, discharge conditions are set according to the quality objectives of river under water directive.

QUESTION 3: PERMIT

Is the permit (determining the quality parameters of discharged waste water) issued by the same authority than the one that check compliance with permit conditions? Comment please to this, whether such a system is right / not good? Advantages / disadvantages

TURKEY	Same authority. But Permit issues are carried by permit department and compliance check is done by inspection department. In my opinion, this separate system is not so efficient. When permit and compliance check are issued by the same authority, experts may have more knowledge about the facility and can monitor the environmental performance of the facility more effectively.
ROMANIA	In Romania we have a particular situation: the conditions for wastewater discharges are established by two permits: water management permit and environmental permit. Of course, the conditions are the same, but those two permits are issued by two different organizations: the water management permit is issued by the „Romanian Waters" National Administration (throughout of its river basin administrations) while the environmental

	permit is issued by National Environmental Agency (throughout its county agencies). The inspections are undertaken by National Environmental Guard (for both permits) and inspection bodies of „Romanian Waters" National Administration (but only in respect with water management permits). Overlapping of competences in both sectors permitting and inspection of wastewater discharged could create issues in implementation and enforcement of water law. To prevent that joint inspections between National Environmental Guard and inspection bodies of „Romanian Waters" National Administration are foreseen and undertaken periodically, especially in case of big IED Installations.
CYPRUS	The permit is issued by the same authority (Department of Environment) with the one that checks compliance with permit conditions. However, the authority is consisted by two distinctive groups, the permitting and the inspection group, thus the permitting and the inspections are carried out by different people. The system is effective since the good communication between the two groups is quite important for the implementation of the Environmental Laws, for the preparation of adequate, solid permits and the performing of good inspections
CZECH REPUBLIC	Permit write - Regional authority Permit can check - Regional authority and Czech environmental inspectorate. Regional authority issue permit for IPPC installation and CEI is involved in permit process and can apply involving their requirements in the permit through statement submit to regional authority in issuing permit process. The system is proven.
DENMARK	It's the same authority that approves the permit and performs inspection (check compliance with the permit condition). I think it's a good idea that it's the same authority because it provides an integrated approach and knowledge from the approval process is utilized in the inspection. If the wastewater is discharged to public wastewater treatment plants is it regulated in a permission granted and inspected by the municipality. The public wastewater treatment plant is regulated by a permission approved by the municipality and inspected by the state.
ESTONIA	No, the permit is issued and controlled by different authority. Our system helps to avoid any kind of corruption.
SLOVAK REPUBLIC	Yes. In Slovak republic the permit is issued by the permitting authority – The Slovak Environmental Inspectorate. The same authority also enforces the conditions of permit. This system is based on the Competence Act and is proven. Inspectors who write authorization know very well the operations and thus can effectively carry out their checks – this is advantage.
SLOVENIA	No. Agency issue the permit and inspectorate inspect. It is good except if it would be one person then an issuing authority would know an installation better. Usually an issuing authority does not see an installation at all.
FINLAND	At the moment no. From 2019 onwards permitting and compliance monitoring will be under the same roof.
PORTUGAL	The permitting and inspection authority are not the same in Portugal. Nevertheless the permitting authority can also do compliance check on water permit conditions. The system

	improves the transparency on the decisions, but increases the need of communication between authorities.
MALTA	Compliance with the permit conditions is checked by a different team within the same authority issuing the permit. This enables better handing over of the case files and continuous communication between permitting and compliance teams thereby facilitating mutual understanding of permit conditions and compliance issues such as enforceability.
SPAIN (NAVARRA)	If discharges are to public sewage system yes If discharges are to river directly not. Basin authorities are responsible
SPAIN (GALICIA)	Yes. Discharge permits are issued by Water Authorities of Water Basins. Permits may be issued by Water Authorities belonging to the Regional administration, in the case of basins within the boundaries of a region, or to the National administration, in the case of basins going beyond the boundaries of a region. If the treated wastewater is discharged to the public sewage network, parameters are laid down in the permit issued by the municipality concerned. IEPs of IPPC/IED installations include permit conditions regarding wastewater discharge and both IPPC Service (permitting Service) of the Regional Ministry of Environment and Spatial Planning and Water Authorities participate in drafting discharge conditions but Water Authorities have the final word. In checking compliance both Environmental Inspection of the Regional Ministry of Environment and Spatial Planning and Water Authorities participate but as in the case of permitting, the Water Authorities have the final word. The system is right when both Authorities are aligned in their action. Otherwise some overlapping and lack of coordination may arise.
SPAIN (CASTILLA LA MANCHA)	Yes, the permit is made by the same authority (Regional Deputy Environment Ministry of Castilla – La Mancha region, Spain) that the one that check compliance with permit conditions, but in the field of wastewater there is a feedback of the national government. In other words, there is a feedback. We send the reports to them and if they detect any non-compliance, they send it to us. It has the advantage that the same authority that knows the permit can do a better follow up of the delivered documentation. On the other hand, the work of the national government is very useful because they have a complementary task to ours.
SPAIN (CANTABRIA)	Depends of the competence of the place where the wastewater is discharged. The Environmental Integrated Authorization (EIA) is issued by the same authority than the one that check compliance with permit conditions only when the wastewater is competence of the Community of Cantabria. In the other cases (mainly discharges to the rivers), it is separated the authorization of the inspection. There are not problems in neither cases, although the advantage of been the same authority is a better transfer of information.
SPAIN (ANDALUCIA)	Yes, the same authority that issued the permit controls its compliance. In our opinion, that's a good system because the authority who make the inspections knows the conditions established in the permit and the complete administrative file of the activity.
NETHERLAND	Yes, by the same authority. This system works fine as long as the section who is checking compliance can work and do research independent from the permitting section.

	Management of both sections is different. Both sections have the same goal to protect the water quality. Advantage More knowledge and experience in one authority. More exchange of knowledge.
ITALY	In Italy the authority issuing IED permits is different from the one responsible of the inspections. Anyway, inspection competent authorities usually participate to the permitting procedure.
POLAND	Permit is issued and inspected by different authorities.
IRELAND	The permit is issued by the Office of Environmental Sustainability (OES) and enforced by inspectors in the Office of Environmental Enforcement (OEE). The offices, while functioning within the EPA, operate independently of each other. Where the discharge is to a sewer network system, a notification is issued to the sewer network authority (Irish Water) who set the emission limit values and these are incorporated by the EPA into the permit. The system works well and from a public viewpoint as there is a clear designation of roles between permitting and inspections.
BELGIUM	In general, the permit is issued by the municipal authority but it's always the regional authority which set emission limit values for water discharges and suggest these limit values to the municipal authority. The compliance with the permit is checked by the Police and Control Department working for the regional authority. This department is never involved in the drafting of a permit.

QUESTION 4: MONITORING

Who runs the analytical measurements of the discharged water? Operator / Inspection Authority / third part-who?

TURKEY	For self-monitoring, analysis is done by accredited laboratory. Results are checked during inspection. Besides, If discharged wastewater flow is more than 10.000 m3/day, the operator has to set online monitoring system which is connected to network of authority. In permit procedure and compliance check the samples are taken by the laboratory. Permit writer also has to be present and check the sampling procedure. Operator pays the analysis.
ROMANIA	All three: the operator has the duty to carry out its self monitoring obligation set up by the permit conditions and this could be done through its own laboratory or by third party laboratories; the „Romanian Waters" National Administration holds its own laboratories through which it can perform analytical measurements.
CYPRUS	The operator has the duty to carry out self-monitoring as set up by the permit conditions and this is done by accredited third party laboratories.; The Inspection Group (Department of Environment) is supported by the State General Laboratory, a public accredited laboratory. DoE may take samples during routine inspections under the control of the implementation of either the Waste Discharge Permits or Industrial Emissions Permits and carry them to SGL for analytical measurements
CZECH REPUBLIC	Third part – laboratory with accreditation. Operator can carry out measurement if have accreditation for sampling and analysing. Inspection authority - CEI – can take sample (but can not use those measurement in administrative procedure) and submit sample to the laboratory for analysing.
DENMARK	Usually it is the third part and only in special cases the company. The results is send to the authority (state or the municipality depending on who has approved the permit). The third part is paid by the operator.
ESTONIA	The operator, who has the duty to carry out self-monitoring obligation (set up by permit conditions). In case of suspicion or problems – Inspection Authority.
SLOVAK REPUBLIC	An operator can perform a measurement if he has a sampling and analysis accreditation or can do so by an accredited laboratory. The inspection authority cannot take samples and is not equipped to analyze them. The inspection authority has an accredited laboratory for this purpose. Third part – Accredited laboratory.
SLOVENIA	Accredited laboratory.
FINLAND	Operator or third party (consultant) paid by the operator.
PORTUGAL	The operator can do its own measurements. The inspection authority takes samples when needed to do cross-check during inspections.
MALTA	The permit obliges the operator to ensure that analytical measures are taken in a determined manner at their own expense. Such monitoring is to be carried out by a 3rd party and at an accredited laboratory. Monitoring can only take place after the Authority approves a method statement in accordance with the permit conditions or in accordance with a monitoring plan submitted as part of the application documentation.

SPAIN (NAVARRA)	Operator – self control (is own laboratory) or external laboratory (UNE-EN 17.025) Inspection Authority – according to annual planning, samples are sent to external laboratory (UNE-EN 17.025) Organism – if water is discharged to rivers, basin authorities can take samples according to its own procedure
SPAIN (GALICIA)	All three: the operator has the duty to carry out its self-monitoring obligation set up by the permit conditions and this is done by accredited third party laboratories.; very few operators have accredited laboratories available and usually only for a limited number of parameters and not all of them. The Inspection Service is supported by the Environmental Laboratory of Galicia, (LMAG in its Spanish and Galician acronym) a public accredited laboratory of the Regional Ministry of Environment and Spatial Planning to take samples and to analyse them to carry out periodic analytical measurements during routine inspections of IPPC/IED installations.
SPAIN (CASTILLA LA MANCHA)	It is made by a third part, it is an authorized control organization (OCA).
SPAIN (CANTABRIA)	The type or frequency of the analytical measurements depends on the permit. The usual controls are: - Self monitoring by the operator (Installation owner)) - Scheduled or discretionary inspections by Inspection Authority - Monthly, quarterly, biannual or annual control by third part, accredited entity collaborating with the administration
SPAIN (ANDALUCIA)	The analytical measurements of the discharge water may be runs by operator (self-monitoring), by authority (inspection) or by third-party. Third party are regional or national ministry authorised entities.
NETHERLAND	The operators of the installations and the Inspection Authorities run the measurements of the discharged waste water. Sometimes operators have outsourced these activities to third parties.
ITALY	Operator is obliged to perform self-monitoring measurements at the discharging point: these are usually performed by a third part (accredited laboratory) on behalf of the operator. Inspection authorities do perform both sampling and analytical measurements; in Italy regional environmental inspection authorities own their own laboratory.
POLAND	The operator is required to ensure that emission measurements are carried out by an accredited laboratory. If the operator has his own accredited laboratory, he performs analysis himself (rarely) if not – third party (most) – accredited laboratory.
IRELAND	The operator is responsible for carrying out analysis of the discharged water at the frequency specified in the permit. This analysis may be carried out by the operators own in house laboratory or sub contracted to an external laboratory. The EPA carry out unannounced sampling and analysis as an independent assessment. This is usually once a year at a minimum. The analysis is carried out by the EPA's own analytical laboratory or, for certain parameters, may be subcontracted to an external accredited laboratory.
BELGIUM	The analytical measurements can be done by the operator and/or an external laboratory.

QUESTION 5: SELF MONITORING

Is the operator responsible for performing monitoring analysis and sending results to the authority? To the one who issued the permit? To other? Which is the frequency set in the permit to send analytical results to the competent authority?

TURKEY	See question 4
ROMANIA	As I indicated to the previous question, the operator is responsible for carrying out the self-monitoring of its wastewater discharges as well as to send the self-monitoring results to the competent authorities, both inspection and permitting authorities. The frequencies for reporting are set up though permit conditions and may vary from quarterly to yearly depending on the size of the installation and its impact on water.
CYPRUS	The operator is responsible for carrying out the self-monitoring and this is done by third party laboratories. Results are submitted to the DoE once every year or whenever the DoE asks them, or during inspections. The frequencies for reporting are set up though permit conditions usually annually and immediately in case of no compliance.
CZECH REPUBLIC	Operator is responsible for performing monitoring analysis and in case of non-compliance operator have to inform inspection authority about breach of permit. Results (summary) from monitoring operator have to send every year as a part of self-monitoring report to the Regional authority (permit writer). Regional authority make self-monitoring report public available via information system IPPC (web page). The frequency for sending self-monitoring report is set in permit (and in legislation too) and is yearly. Operator have not obligation send results from analytical measurement to the Czech environmental inspectorate automatically, but have to send measurements on request and have to submit measurement during inspection.
DENMARK	See question 4
ESTONIA	The operator is responsible for performing monitoring analysis to the permit giver. To the inspector upon request. The frequency is set in the permit, it can vary from monthly to annually.
SLOVAK REPUBLIC	Yes. Operator is responsible for performing monitoring analysis and in case of non-compliance operator have to inform inspection authority about breach of permit. Results (summary) from monitoring operator have to send every year as a part of self-monitoring report to the permit authority - SEI. The frequency for sending self-monitoring report is set in permit (and in legislation too) and is yearly. Operator have obligation send results from analytical measurement to the Slovak Environmental Inspectorate automatically, but have to send measurements on request and have to submit measurement during inspection.
SLOVENIA	Operator has to hire an accredited laboratory and then send report to issuing authority. Ones per year.

FINLAND	Yes, to the monitoring authority and to the concerned municipal environmental authority. The frequency is set in the permit and can vary from monthly to annually.
PORTUGAL	The operator is responsible to perform monitoring analysis and send its results to the permitting authority. The frequency is usually one trimester.
MALTA	Yes the operator of permitted installations is responsible to submit results of the performed analysis to the Authority which issued the permit and is checking on compliance (same Authority as described above) on an annual basis as part of an Annual Environmental Report. Each permit would then specify the type and frequency of the required analysis. For example, certain operators are required to collect and submit quarterly data on certain parameters discharged into the marine environment. Additional monitoring requirements other than the Annual Environmental Reports, and as stated in the environmental permit may also be submitted on a regular basis as agreed upon with the Authority.
SPAIN (NAVARRA)	Yes, usually is established in the permit Yes, to the one who issued the permit. For facilities not included in the 2010/75/UE Directive range, sometimes local authorities Every three or six months or every year.
SPAIN (GALICIA)	The operator is responsible for carrying out the self-monitoring and this is done by third party laboratories (with very few exceptions). Results are submitted to the IPPC Service (Permitting service). In IPPC/IED installations, the IPPC/IED Services provides all the results of self-monitoring to the Inspection Authority for routine inspections. The frequencies for reporting are set up though permit conditions and may vary from monthly, quarterly to yearly depending on the size of the installation and its impact on water.
SPAIN (CASTILLA LA MANCHA)	The operator is responsible for sending monitoring results to the authority. It sends these results to the same authority that issues the permit. The frequency depends on the importance of the plant. An usual frequency is one year.
SPAIN (CANTABRIA)	The operator is responsible for performing monitoring analysis and sending results to the authority who issued the permit with the frequency set in the permit (changeable: monthly, quarterly, biannual or annual).
SPAIN (ANDALUCIA)	Yes, the Andalusian law (Decreto 109/2005) regulates the operator obligation for performing analysis and sending to the authority who issued the permit. The frequency to sending the analytical results is established in each permit, although it is variable, from once in each year to even several sendings per month
NETHERLAND	An operator in the Netherlands is responsible for performing monitoring analysis, not for sending results to the competent authority (due to reducing administrative expenses for the industry). Incidents (with the possibility that permit conditions, e.g. limit values, are exceeded) should be reported to the authorities.
ITALY	The operator is responsible for performing monitoring analysis according to the contents of the self-Monitoring Plan which is part of the IED permit and sets frequencies, methods and parameters. Results are sent once per year (within the 30th of January) to the Authority who issued the permit, the inspection authority and other involved authorities (municipalities ecc.)

POLAND	Yes, to both: authority who issued the permit and inspecting authority. Measurement results are submitted: 1) in the case of periodic measurements performed more than once a month - within 30 days of the end of the quarter in which the measurements were made; 2) in other cases - within 30 days of the end of the measurement.
IRELAND	Yes. Depending on the results of analysis will dictate how reporting is carried out. Typical scenarios are as follows: (i) Non-compliant results: Where the results of analysis indicate an exceedance of an emission limit value the permit holder must immediately notify the EPA of this as an incident. The permit may specify that the sanitary authority/fisheries board etc. may also need to be notified. (ii) Compliant results: These may be submitted to the EPA for assessment at least in the Annual Environmental Report or more frequently such as quarterly or monthly as agreed with the Agency or as specified in the permit. Such monitoring is published on the EPA website.
BELGIUM	The operator is responsible for performing monitoring analysis provided in the permit and sending results to the responsible authority to check compliance.

QUESTION 6: INSPECTION

Does the inspection authority have a checklist to perform an inspection in a industrial water treatment plant? If yes, please attach it

TURKEY	Yes but not available in English
ROMANIA	Up to now we do not use such tools in our inspections.
CYPRUS	No, the DoE doesn't have a specific checklist to perform an inspection in an industrial wastewater treatment plant. The inspection is based on the terms of the IED Permit.
CZECH REPUBLIC	No
DENMARK	Some have – it's part of the inspection of the whole industrial plant. Denmark has 98 municipalities and they decide for themselves how they are performing the inspection. There are some guidelines from the state.
ESTONIA	No checklist are used.
SLOVAK REPUBLIC	No. The inspection authority checks the individual permit conditions.
SLOVENIA	No
FINLAND	Inspection of the industrial wastewater treatment plant is included in the inspection of the whole industrial plant. No checklists are used but an agenda for the inspection.
PORTUGAL	No
MALTA	No such standard checklists exist. Case specific checklists are prepared using the particular permit and making reference to previous on site inspections before any inspection at such an installation.
SPAIN (NAVARRA)	Yes

6	AGUAS RESIDUALES		S	N	NP
1	Los puntos de vertido existentes son los indicados en la Licencia de actividad				
2	Los efluentes existentes son los autorizados y están identificados según la Licencia				
3	Las instalaciones de tratamiento son los indicados en la Licencia				
4	Los elementos de control en continuo son los indicados en la Licencia				
5	Los elementos de control en continuo disponen de los certificados de calibración e instalación indicados en la Licencia				
6	Se anotan los datos de consumo de agua y volumen vertido de todos los contadores y caudalímetros con la periodicidad indicada en la Licencia				
7	Realización de controles reglamentarios según AAI	Se realizan con la periodicidad establecida en la Licencia			
		Se cumplen los VLE			
8	Realización de autocontroles según AAI	Se realizan con la periodicidad establecida en la Licencia			
		Se cumplen los VLE			

7	EFLUENTES DE VERTIDO DE LA PLANTA

PUNTO		EFLUENTE						Realización de controles reglamentarios según Licencia	Cumple VLE
Nº	Destino	Nº	Nombre	Sistema tratamiento	Dispositivo control	Accesibilidad	Equipo medición continuo		
1	Colector de residuales	1	Aseos y servicios	Ninguno	Arqueta que permita la inspección visual y la toma de muestras	--	--	--	--
2	Colector de residuales	2	Limpieza de maquinaria	EDARI: Homogenización con aireación y tratamiento biológico	Canal abierto normalizado y medidor de caudal	S	N	--	--
		3	Limpieza de maquinaria						
		4	Osmosis inversa del suero lácteo						

					MBBR					
	3	Colector pluviales	5	Cubiertas y zonas pavimentadas	Ninguno	Ninguno	--	--	--	--
	Observaciones									

SPAIN (GALICIA)	No, the Inspection Service doesn't have a specific checklist to perform an inspection in an industrial wastewater treatment plant, so far, but wastewater discharge is included as a chapter in the check-list issued to perform routine inspections in IPPC/IED installations. Items regarding wastewater discharge make up the chapter
SPAIN (CASTILLA LA MANCHA)	Yes, we have a check-list for each type of plant. A part of this check-list is related to wastewater.
SPAIN (CANTABRIA)	When the inspection of the wastewater is competence of the Community of Cantabria, we have a check list with all the conditions imposed in the EIA (atmosphere, noise, residues… included waste waters), it's adapted for each installation.
SPAIN (ANDALUCIA)	The check lists are made individually before each inspection and incorporates all the specific conditions established in the permit. There's not general checklist available, but we attach a couple of particular examples
NETHERLAND	Yes, there are different checklists and instruction manuals. The instruction manual for sampling wastewater is attached (in Dutch).
ITALY	A general checklist for wastewater discharge has been issued by the network of environmental agencies.
POLAND	Yes, in our system we have 3 checklist regarding waste water: 1. Municipal wastewater treatment plants 2. Water and wastewater management 3. Industrial plants (general) We can modify them according to our needs
IRELAND	No. Checklists are routinely used but not for the industrial water treatment plant. To date, in this area, the checklists have focussed on the quality criteria for the robustness of analytical data and associated quality control.
BELGIUM	No

QUESTION 7: INSPECTION

If a breach of the limit value is declared within the self-monitoring report (provided by the operator to the competent authority), can this data be used to give a penalty/fee etc ?

TURKEY	No. Two more analysis has to be done and the inspector has to be present during sampling. If the average value of three result (one from self-monitoring) exceeds the limits, than the authority can issue a penalty
ROMANIA	We use the self-monitoring reports as tools for checking the compliance with the permit conditions. In case we notice from such reports that the results of analytical measurements are not complying with the maximum allowed concentration for one or more quality parameters set un in the permit than an inspection (site visit) is undertaken in order to enforce the permit condition. Usually this means that the operator is punished by a penalty for breaching the permit conditions but also a permit suspension may be taken into consideration
CYPRUS	Yes
CZECH REPUBLIC	Yes, but often after submitting self-monitoring report (with declared breach of emission limit value) competent authority make action for verifying non-compliance (ask operator for more detail or make site inspection).
DENMARK	If there are exceedances of the terms of approval, this will be excluded by the state/ the municipality - and may end with a police report and a fine. The police conduct investigations and hands over the case to the public prosecutor if there has been a crime. The competent authority may also order a stop of the discharge of waste water. The competent authority itself can issue no fine. The fine is imposes by the court.
ESTONIA	Yes (fee)
SLOVAK REPUBLIC	Yes, but often after submitting self-monitoring report (with declared breach of emission limit value) competent authority make action for verifying non-compliance (ask operator for more detail or make site inspection).
SLOVENIA	Yes
FINLAND	Yes
PORTUGAL	Yes, usually only after one inspection on the plant where those results are observed
MALTA	When such a breach is reported, the Authority requests further corrective action to rectify that breach. Moreover, should the operations result in exceedance of the emission limit values indicated in the permit, the operator is required to designate a mixing zone as stipulated in the requirements of the Water Framework Directive or to apply for derogation from achieving the required emission levels. There is a mechanism in the permits which requires the operators to declare the non compliance upon identification. Thus the authority is not only notified upon the submission deadline of the quarterly or annual reporting episode.
SPAIN (NAVARRA)	Yes, but only if the self-monitoring report comes from a UNE-EN 17025 laboratory
SPAIN (GALICIA)	Yes

SPAIN (CASTILLA LA MANCHA)	If there is a breach of the limit value in the sent report, a penalty procedure can be started.
SPAIN (CANTABRIA)	When the inspection of the wastewater is competence of the Community of Cantabria, the Self monitoring report provided by the operator can be used to give a penalty/fee only if it is done by an accredited laboratory; although the usual procedure would be to check it with measurements made by the administration.
SPAIN (ANDALUCIA)	Yes, obviously the knowledge noncompliance with the limit values can be used to give a penalty or fee. If the breach is declared within the self monitoring report, the noncompliance evaluation must be determined under Decreto 109/2015 criteria. In any case, the common mechanism to issue a penalty is associated within the inspections performed by the authority. The self monitoring report is usually used for increase or relax the authority control of the activity.
NETHERLAND	It is possible to use this data when this is specifically addressed in the permit of the operator. The authorities want to use these data also in other situations, but that is not possible yet in the Netherlands. This is subject of discussion (with the industry).
ITALY	A breach of the limit values declared within the Self monitoring report (provided by the operator to the competent authority), does not constitute itself an automatic evidence of the violation without a technical check that should be performed by the inspection authority. Therefore, a non compliance declared in the report of the operator is not enough for a sanction but it has to be technically verified by the inspection authority.
POLAND	Yes, decision imposing administrative punishment
IRELAND	Yes. If a breach of an emission limit value is reported, a non-compliance is issued by the EPA. For repeat offences a prosecution could be taken but this would typically involve results of analysis for samples taken by the EPA in conjunction with results of the operators self monitoring. Non-compliances, along with other enforcement aspects, area assigned a weighting which contributes towards the calculation of licence compliance for preparation of the national priority site list used by the EPA. This is published on a 6 monthly basis (further details are available at the following link http://www.epa.ie/enforcement/nationalprioritysites/). The EPA have no powers to issue a monetary penalty.
BELGIUM	This data can be used to write an official report sent to the prosecutor who gives penal sanction and to the civil servant who gives administrative penalty.

QUESTION 8: ENFORCEMENT

Based on what measurements, in case of non-compliance, does the authority issue a penalty? Conducted by authority? By operator? Other?

TURKEY	If the sample taken during inspection does not comply with the standards, inspection authority applies sanction.
ROMANIA	As previous mentioned the measurement can be carried out by operator, third parties or competent authority. If any of these measurements unravel beaching of permit conditions regarding ELVs than a penalty may be issued by the inspection authority..
CYPRUS	Mainly when conducted by the authority but exceedances of ELV recorded in self-monitoring reports may also lead to penalty procedures.
CZECH REPUBLIC	Conducted by accredit laboratory. In case that operator have own accredited laboratory is possible used operator measurement for issuing penalty
DENMARK	See question 7
ESTONIA	Measurement can be carried out by competent authority. In case of non compliance penalty may be issued by Inspection Authority.
SLOVAK REPUBLIC	Yes. Conducted by accredit laboratory. In case that operator have own accredited laboratory is possible used operator measurement for issuing penalty.
SLOVENIA	Inspection react on a base of a monitoring report prepared by an accredited laboratory.
FINLAND	In case of non-compliance the competent authority asks the police to conduct investigations, if the non-compliance is because of a crime. If the investigations show to a crime, the police hands over the case to the public prosecutor. If the case goes to the court, the competent authority is called to the court as a witness. The competent authority itself can issue no penalties.
PORTUGAL	The penalty is issued by the inspection authority only after one inspection on the plant, and it is based on evidences collected during the inspection namely the monitoring results performed by the operators.
MALTA	The Authority issues a penalty based on the type, gravity and duration of a non compliance with permit condition. This also depends on whether the operator rectifies such a non compliance within the timeframes agreed upon with the authority.
SPAIN (NAVARRA)	Accredited laboratories (UNE-EN 17.025) and inspection organisms (UNE-EN 17.020)
SPAIN (GALICIA)	Mainly when conducted by the authority but exceedances of ELV recorded in self-monitoring reports may also lead to penalty procedures.
SPAIN (CASTILLA LA MANCHA)	Yes, a penalty procedure can be started by the authority that has issued the permit.
SPAIN (CANTABRIA)	It is the competent authority who issues a penalty in case of non-compliance.
SPAIN (ANDALUCIA)	The authority may issue a penalty in noncompliance cases based in measurements conducted mainly by the authority and, to a lesser extent, by the operator and third-part.
NETHERLAND	Mostly on measurements conducted by the authority. Sometimes based on a message and/or measurements of the operator (see answer 7). Violation of rules can also be prosecuted by the Public Prosecution Service (`Openbaar

	Ministerie´/OM). Its field of work is criminal law. Some civil servants of the competent authority are called special investigating officers (´buitengewoon opsporingsambtenaar´). They are managed directly by the Public Prosecution Service. The Public Prosecution Service and the courts together make up the judiciary. The Public Prosecution Service decides who has to appear before a court and on what charge.
ITALY	A penalty can be issued on the based on the results of the analysis performed by the competent authority; it can also be issued on the basis of a negative result of a technical assessment following a breach of the limits detected in the annual report of the operator.
POLAND	Conducted by operator in accredited laboratory (own or external)
IRELAND	As outlined in the answer to question 7, a prosecution (penalty) can be taken using the EPA results and those of the operator. However, there are occasions where the operator's results alone may be used alone for a prosecution. A non-compliance is issued as a minimum for exceedances of the emission limit value.
BELGIUM	Measurements conducted by authority or by operator.

QUESTION 9: ENFORCEMENT

What is the type of punishment for exceeding the permissible conditions? Fine / decision / other

TURKEY	Just giving fine or fine with stopping the facility.
ROMANIA	In this case a penalty is issued and also the suspension of the permit is asked until the operator complies with the ELVs. If the operator doesn't comply within 6 months then the cancelation of the permit is asked by the inspection authority. The suspension and cancelation of the permit is issued by the decision of permitting authority.
CYPRUS	Out of the court fines can be imposed by the DoE inspectors up to 4000 Euros for every offence. Additionally when offences are taken to court, monetary fines can be imposed or/and the operator can go to jail according with the provisions of the Law. For very serious offences which include cases in which human health and the environment are seriously threatened, the Chief Inspector can ask the court to prohibit operation.
CZECH REPUBLIC	Most often are imposed fine, but is possible impose remediate measures and in case of serious non-compliance is possible impose restriction operation or closing down part or whole installation.
DENMARK	See question 7
ESTONIA	Fine and administrative procedure and injunction
SLOVAK REPUBLIC	First, remedial measures are imposed and, in the event of a serious breach, non-compliance may impose a fine, limit operation or shut down operations.
SLOVENIA	Both a fine and a decision. A decision is a curative measure to solve the problem. An administrative fine in restrictive measure and do not solve a problem but it has an educational effect.
FINLAND	Depends on the severity of the crime and if done on purpose or on pure negligence, and on the impact in the environment from fine to jail.

PORTUGAL	Usually is a fine. The operator may be ordered by the inspection authority to cease the discharge when the measurements are exceeding the conditions on the permit or in other situations like when is making an unauthorized discharge.
MALTA	When exceeding permissible conditions, the authority may decide to take Administrative action, legal Action or withdrawal of bank guarantees
SPAIN (NAVARRA)	Usually fine Exceptionally partial or total closure
SPAIN (GALICIA)	Both fines and decisions. In our legal system administrative offences are classified in non-serious, serious and very serious offences. Penalties provided for on-serious and serious offences are in general fines and the obligation to restore the situation to its original state. For very serious offences, which include cases in which human health and the environment are seriously threatened, additionally a decision to prohibit operation can be the result.
SPAIN (CASTILLA LA MANCHA)	The sanction can be a fine or the withdrawal of the permit in the more important cases. It can also include criminal liability and in this case the competent authority is the Criminal Court.
SPAIN (CANTABRIA)	Fine and/or decision.
SPAIN (ANDALUCIA)	Usually the type of punishment for exceeding the permissible conditions is to impose a fine. Only in cases where there is an imminent threat of damage to the environment, authority may take decisions, like activity clausure, against the operator. In any case, that's regulated in wastewater and environmental quality laws.
NETHERLAND	Administrative sanctions are: Official warning Order of penalty payment in a cease and desist letter (`Last onder dwangsom´) Administrative enforcement Withdrawal permit
ITALY	According to the non compliance the penalty can be an administrative fine or follow a penal path. Furthermore, Competent Authority sets a deadline within which the operator has to comply again with the permit. The further step (whether the operator does not restore the compliance situation or in case of a second breach) is the closure of the plant and the withdrawal of the permit.
POLAND	Decision imposing administrative punishment (=Q7)
IRELAND	A notification of non-compliance will issue as standard in the event of an exceedance of the emission limit value. For repeat offences a prosecution will be considered in line with the EPA's enforcement policy. The result of a prosecution on conviction is a fine.
BELGIUM	When the environmental inspector makes a report to the authorities : • The prosecutor has 30 or 60 days to say « I pursue the offender ». • If he doesn't pursue the offender, the civil servant adjudicator has six months to impose penalties. Every legislation sets out illegal behaviours and the level of the offence regarding to the behaviour. The range of penal sanctions and administrative penalties depends on the level of the offence.

The decree fixes 4 levels of non-compliance from 1 to 4, level 1 being the most serious non-compliance situation and the level 4 being the less serious non-compliance situation.

Punishment and fines

Level of non-compliance	Criminal penalties	Administrative sanctions
1	Imprisonment : 10 to 15 y Fines : 100.000 to 10.000.000 €	-
2	Imprisonment : 8 d to 3 y Fines : 100 to 1.000.000 €	Fines : 50 to 100.000 €
3	Imprisonment : 8 d to 6 m Fines : 100 to 100.000 €	Fines : 50 to 10.000 €
4	Imprisonment : - Fines : 1 to 1000 €	Fines : 50 to 1.000 €

Moreover, when an environmental inspector reports to the authorities, he can write a report to the mayor and ask, for example :

- The full or partial closing of a plant or an activity.
- Putting the seals on devices.
- To ask to the offender the temporary closing of an installation.
- To impose to the offender a rehabilitation plan.
- Any kind of actions to stop a danger for the environment and human health.

QUESTION 10: ENFORCEMENT

Who imposes a penalty? (Licensing authority / inspection body / court / other)

TURKEY	Inspection body
ROMANIA	The penalty is imposed by the inspection authority (National Environmental Guard and inspection bodies of „Romanian Waters" National Administration). The operator may to submit a complaint against penalty report to the competent court within 30 days after the penalty report is issued or communicated. The court may decide to maintain the penalty, to reduce the level of penalty, to replace the penalty with a warning or even to cancel the penalty report.
CYPRUS	The Inspectors of the DoE can impose out of the court fines. Additionally, when offences are driven to court, the court can imposes monetary fines or/and can send the operator to jail according with the provisions of the Law.
CZECH REPUBLIC	Inspection authority, and is possible impose fine by Permit authority
DENMARK	See question 7
ESTONIA	Inspection Authority. Criminal cases - court
SLOVAK REPUBLIC	Inspection authority. The court may change the decision to inspect the fine.
SLOVENIA	Inspector
FINLAND	Court
PORTUGAL	Inspection body or the water permitting authority.
MALTA	The inspection body and the licensing (permitting) body form part of the same authority. In cases referred for court action, the court imposes penalties as prescribed in the law.
SPAIN (NAVARRA)	Licensing authority (local or regional government); inspection body only proposes to start the penalty procedure Court only if there is exceptionally serious effects or a legal resource
SPAIN (GALICIA)	Depending of the classification of the offences (non-serious, serious and very serious), penalties are imposed by officials at different levels of the Regional Ministry of Environment and Spatial Planning. The penalties corresponding to very serious offences are imposed either by the Regional Ministry or by the Government. Inquiries leading to the penalties are carried out by lawyers (civil servants) of the Legal Services of the Regional Government The Permitting Service (IPPC Service) and the Inspection Service participate in the procedure providing all the information available: inspection minutes and reports, self-monitoring reports etc
SPAIN (CASTILLA LA MANCHA)	The inspection body proposes the start of the civil sanctions and the procedure is analysed by the Juridical Service. It could in some cases arrive to the Legal Authority.
SPAIN (CANTABRIA)	The penalty is imposed by the Authority with competence in the place where the wastewater is discharged.

SPAIN (ANDALUCIA)	Usually the penalties are impose by the license authority, who is assisted by the inspection authority.
NETHERLAND	The inspection body is competent for administrative sanctions. Criminal prosecution is done by Public Prosecution Service.
ITALY	The inspection authority assesses the non compliances and report to the Competent Authority suggesting the measures to be taken; the last one imposes the penalty.
POLAND	Inspecting body
IRELAND	Prosecution in the courts is taken by the office of environmental enforcement unit of the EPA. The fines are decided by the court based on the evidence provided.
BELGIUM	Inspection body controls the execution of a penalty.

QUESTION 11: LAB ANALYSIS

Should sampling and lab analysis have to be performed by an accredited entity? In the case of sampling or analysis without accreditation, are measurements considered invalid?

TURKEY	Yes should be. The facility can do analyses by itself for its own check. In the case of sampling or analysis without accreditation, the measurements are considered invalid.
ROMANIA	At least once a year the operator has to perform the self-monitoring through an accredited laboratory. If this requirement is not fulfilled then a breaching of the permit condition is took into consideration.
CYPRUS	The accredited entity must be accredited for sample collection (which includes planning of sampling) and for analysing each of the parameters included in the discharge conditions. If both accreditations (accreditation for sampling and accreditation for analysing samples in laboratory) cannot be proofed, the measurements are not considered invalid but can be easily challenged in court procedures. In these cases, the results regarding the parameters for which the entity lacks accreditation are not considered invalid but again can be challenged in court procedures.
CZECH REPUBLIC	Sampling and lab analysis have to be perform by an accredited entity.
DENMARK	Usually sampling and analysis should be accredited but in special cases the company can do it themselves. The measurements are considered invalid.
ESTONIA	Sampling and lab analysis should be accredited.
SLOVAK REPUBLIC	Sampling and laboratory analysis have to be perform by an accredited entity.
SLOVENIA	Yes – accredited laboratory.
FINLAND	Sampling and lab analysis should be accredited.
PORTUGAL	Sampling can be done without accreditation, and the results are considered valid. The analysis procedure is determined by law and that procedure is accredited by a national accreditation organism. In case of divergence in wastewater analysis performed by the operator and the inspection the result obtained from the analysis carried out by the

	National environmental lab serve as proof.
MALTA	Lab analysis has to be usually carried out at a laboratory accredited to at least EN ISO 17025:2005/Corr 1:2006 and preferably for each and every test. In case analysis is to be carried out without accreditation, this would be subject to a specific approval by the Authority upon submission of further details on the proposed analytical methods and laboratory.
SPAIN (NAVARRA)	Yes, not accredited entities or laboratories are not considered as acceptable It depends of the case, but sampling by accredited entities are strongly preferred. In court would be unacceptable
SPAIN (GALICIA)	Definitely yes. The accredited entity must be accredited for sample collection (which includes planning of sampling) and for analysing each of the parameters included in the discharge conditions. The accreditation is issued by the Entidad Nacional de Acreditación (ENAC) which is the agency entitled by the government to operate in Spain as the only National Accreditation Body, pursuant to Regulation (EU) No 765/2008 that regulates the functioning of accreditation in Europe. If both accreditations (accreditation for sampling and accreditation for analysing samples in laboratory) cannot be proofed, the measurements are considered invalid. If may happen that the entity is accredited for analysing some parameters and not others. In these cases, the results regarding the parameters for which the entity lacks accreditation are considered invalid and the operator is requested to repeat the sampling and analysis for those parameters. Additionally all staff participating in the sampling and analysing must be internally qualified by the accredited entity. Qualification procedures are checked by ENAC.
SPAIN (CASTILLA LA MANCHA)	Yes, it can be done by an accredited entity.
SPAIN (CANTABRIA)	The sampling and lab analysis have to be performed by an accredited entity if not they are considered invalid.
SPAIN (ANDALUCIA)	The response is affirmative for both questions. Only if the sampling and lab analysis is performed by operator (self monitoring) can be out of accreditation.
NETHERLAND	Yes, the laboratory should have an accreditation.
ITALY	Sampling and lab analysis have to be performed, on behalf of the operator, by an accredited entity. In the case of sampling or analysis without accreditation, measurements are considered invalid.
POLAND	Yes, only accredited entity. In the case of sampling without accreditation or analysis without accreditation, measurements are considered invalid. For measurements performed in a non-accredited laboratory, inspecting body will impose administrative punishment by way of a decision.
IRELAND	Ideally yes. The EPA recommend that analysis is carried out by an accredited laboratory and that the individual analytical test methods are accredited. The EPA have provided guidance to operators in this regard to ensure that the results or analysis are robust. This area has been a focus of enforcement site visits where issues such as sample handling, test methods (CEN/ISO etc.) and quality control have been assessed. Further details of EPA guidance on this matter is available at the following link

	http://www.epa.ie/pubs/advice/water/aq/ . Where sampling or analysis are not accredited there are extra checks carried out during Agency visits to verify the robustness of results being reported.
BELGIUM	Self-monitoring measurements can be done: • By the operator in some cases like on line or daily measurements. • By accredited entity. It depends on the conditions of the permit. Sampling has to be performed by an accredited entity or by the inspection body. Inspection body has to respect a legal procedure set by a decree.

QUESTION 12: LAB ANALYSIS

Does the inspection authority perform sampling and analysis on its own?

TURKEY	In some special cases, the laboratory department and inspection department of Ministry can do inspection together. In this cases laboratory department takes samples, do the analysis and send to results to inspection department.
ROMANIA	The National Environmental Guard doesn't but the „Romanian Waters" National Administration does.
CYPRUS	The Inspection authority performs only sampling. The inspection authority (Department of Environment) is supported by the State General Laboratory, a public accredited laboratory. DoE takes samples during routine inspections under the controlling of the implementation of either the Waste Discharge Permits or Industrial Emissions Permits and carry them to SGL for analytical measurements.
CZECH REPUBLIC	Perform sampling yes (but can not use those measurement in administrative procedure), perform analysis no, have to ask accredited lab.
DENMARK	Usually not on wastewater from industries.
ESTONIA	Yes (if there were not violation)
SLOVAK REPUBLIC	No, the inspection authority must require an accredited body to collect and analyze it.
SLOVENIA	No. But sometimes hire an accredited laboratory.
FINLAND	On surface water quality yes, not on wastewater discharge.
PORTUGAL	Only sampling. Analysis are being done on accredited public labs.
MALTA	The Authority does not usually perform sampling and analysis on its own but it requires operators to conduct such measurements at their own expense as directed by the Authority. The authority is however empowered to take all the necessary samples and carry out sampling tests as it deems necessary
SPAIN (NAVARRA)	Yes, sampling is performed by public accredited organism (UNE-EN 17.020); samples are sent to accredited laboratory (UNE-EN 17.025)
SPAIN (GALICIA)	Yes, but supported by the Environmental Laboratory of Galicia (LMAG in its Spanish and Galician acronym) both for sample collection and analysis.

	Environmental Inspectors are qualified for water sample collection
SPAIN (CASTILLA LA MANCHA)	No, they are performed by authorized inspection entities.
SPAIN (CANTABRIA)	When the inspection of the wastewater is competence of the Community of Cantabria, there are sources to perform sampling and analysis on its own.
SPAIN (ANDALUCIA)	Yes, the inspection authority has its own accredited entity for sampling and lab analysis.
NETHERLAND	The inspection authorities perfom sampling on their own. Most of the analysis is done by a central accredited laboratory. Some specific parameters are analysed by other, commercial, accredited laboratories.
ITALY	Yes. Regional environmental inspection agencies have their own laboratories.
POLAND	Yes, if authority believes that the measurements submitted by the subject are doubtful or if authority wants to verify the measurements of the operator but inspection authorities own measurements can not be the basis for the legal imposition of the penalty. They may be the reason for not recognizing the results of the operator and only considering measurements of operator not valid may impose a penalty.
IRELAND	Yes on an annual basis typically and in some cases in response to incidents.
BELGIUM	The inspection only performs sampling. Analyses are always performed by an accredited laboratory.

QUESTION 13: LAB ANALYSIS

Which compliance criteria is adopted to the measure and its uncertainty in relation to the limit?

TURKEY	Discharged wastewater quality limits are defined in Bylaw for each industrial sector. A communique defines also sampling procedure and analysing methods
ROMANIA	Don't know.
CYPRUS	Uncertainty is taken into account to decide whether the limit is exceeded or not.
CZECH REPUBLIC	The results of accredited lab is accepted and compared with emission limit
DENMARK	That is set in the permit. The state has some guidelines.
ESTONIA	It is set in the permit
SLOVAK REPUBLIC	The results of accredited laboratory are accepted and compared with emission limit.
SLOVENIA	---
FINLAND	That is set in the permit.
PORTUGAL	The compliance criteria are stablished in the permit. The uncertainty is taken in account to check on the compliance during inspection.
MALTA	The Authority currently obliges operators to abide by the monitoring specifications and minimum performance criteria delineated in 2009/90/EC.
SPAIN (NAVARRA)	Value + uncertainity must be lower than limit

SPAIN (GALICIA)	Uncertainty must be taken into account to decide whether the limit is exceeded or not.
SPAIN (CASTILLA LA MANCHA)	The used criteria is the uncertainty of the measurement device.
SPAIN (CANTABRIA)	When the inspection of the wastewater is competence of the Community of Cantabria, the measurement uncertainty is considered to check the compliance with the limit
SPAIN (ANDALUCIA)	If the lab value is IN the uncertainly interval, it's consider non evaluable; if it's UNDER the uncertainly interval, it's consider compliance with the limit value; and if it's ABOVE the uncertainly interval, it's consider non-compliance with the limit value.
NETHERLAND	In the Netherlands there are two kinds of emission limit values: theoretical and empirical (based on a dataset) with different uncertainty in relation to the limit. Rounding of figures is also taken into account.
ITALY	A national guideline has been issued (http://www.isprambiente.gov.it/it/pubblicazioni/pubblicazioni-del-sistema-agenziale/I2019analisi-di-conformita-con-i-valori-limite-di) to manage with uncertainties in the comparison with threshold limits.
POLAND	Uncertainty of measurement is an expanded uncertainty calculated using an expansion factor of k = 2, which corresponds to a confidence level of approximately 95%.
IRELAND	It is a bit unclear as to what the question is asking here. The laboratory analysis is generally carried out to ISO17025 standard. The uncertainty is established from validation of the test method. The testing laboratory is subject to audits from an external agency such as INAB (Irish national accreditation board). Reports of analysis results must comply with the requirements of ISO17025 and provide a value for uncertainty.
BELGIUM	For the moment, no criteria are adopted.