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Industrial Wastewater Indirect Discharges in Integrated Pollution Prevention and Control Perspective: A Case Study of Prague

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Wastewater discharge is one of the sources of environmental pollution. Wastewater pollution originates, inter alia, in industrial wastewater. After treatment, industrial wastewater can be discharged directly into the receiving water body or indirectly into a sewerage network terminated by the concluding stage of wastewater treatment. In the Czech Republic, indirect wastewater discharges are obeyed by the contractual relationship between the wastewater producer and the sewerage network operator. General limits for indirectly discharged wastewater are not set by any national legislation. The aim of this paper is a description of industrial wastewater discharged into the municipal sewerage system in Prague and possibilities of setting limits for installations undertaking the industrial activities listed in Annex I of the Integrated Prevention Act. The study showed that 72% of installations discharge industrial wastewater indirectly. The majority are energy plants that produce boiler blowdown wastewater. More than 80% of wastewater from studied installations is treated by one central wastewater treatment plant. The studied installations are equipped with a wastewater neutralization unit. However, despite the existence of the legislative framework to propose limits for studied installations, only two installations covered by BAT conclusions with relevant BAT-AELs for indirect discharges to the receiving water body were determined. Generally, a small percentage of installations can be limited by an integrated permit due to an inconsistent approach to the issue of indirect discharges from installations under the scope of the Integrated Prevention Act.

Keywords: industrial wastewater, indirect wastewater discharge, IPPC, BAT conclusions, wastewater treatment.

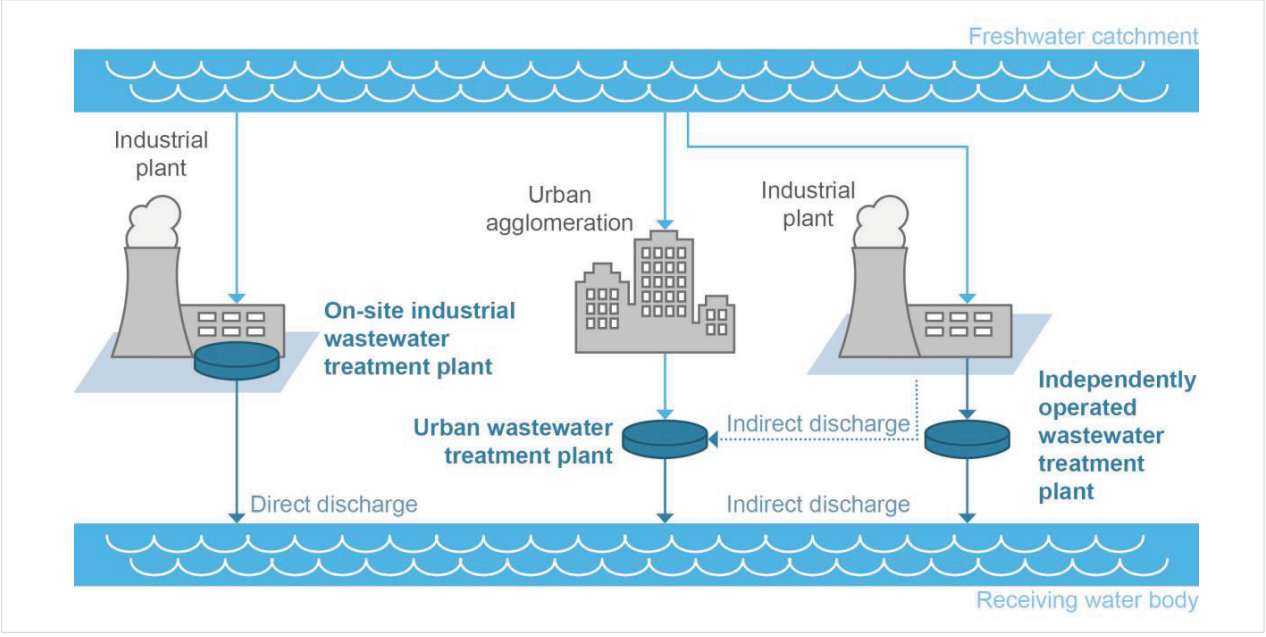
Introduction

Industry, although limited by legislation, emits a wide range of substances into the environment. Wastewater is one of the sources of environmental pollution, and therefore it is necessary to treat it. Wastewater treatment technologies have undergone many changes in recent decades. Different types of wastewaters require different treatment, especially if they contain specific pollutants such as heavy metals, pesticides, ecotoxic compounds, etc. (Gartiser et al., 2010). Despite the knowledge of the techniques and conditions necessary to remove specific pollutants, industrial wastewater is often treated by wastewater treatment plants (WWTPs) used for municipal wastewater treatment, with minimal or no pre-treatment (European Environment Agency, 2019).

While high quality water is essential for most industrial processes, many of these processes generate large volumes of wastewater containing wide range of pollutants (Aulinas et al., 2011; Yan et al., 2021). Industrial facilities can be located in industrial areas with a unified sewerage network, which is terminated by a biological wastewater treatment plant. In case the facility is located close to the municipal sewerage network, wastewater may be discharged into the municipal sewerage system, which is terminated by a municipal wastewater treatment plant as shown in *Fig. 1*. Discharges of industrial wastewater into the sewerage system are also used in cases where it is not possible to discharge wastewater directly into the receiving water body. Wastewater can be pre-treated before being discharged to the sewerage, but many facilities discharge wastewater directly into the sewerage without pre-treatment (European Environment Agency, 2019). In general, this method is referred to as indirect wastewater discharge. Indirect wastewater discharge for the purpose of this study means the discharge of wastewater into the sewerage system.

The indirect wastewater discharges can cause damage to the sewerage network, e.g., material damage if the discharged water is corrosive, or clogging the sewerage network in case of fat-containing wastewater discharge (Wang et al., 2005; Üstün, 2009). The risk, which is significantly greater than the above-mentioned damage to the sewerage network, is damage to the biological wastewater treatment plant, which is the terminal equipment of the sewerage network (Illoms et al., 2020). Wastewater treatment plants designed to treat average urban wastewater can face countless problems due to industrial leaks, such as deterioration in the efficiency of the treatment process caused by inhibitors or decreasing quality of sewage sludge (Fältström and Gustafsson, 2021).

Fig. 1. *Possible industrial wastewater discharges (source: Czech Environmental Information Agency)*



In the Czech Republic, 27% of wastewater discharged into sewerage network is industrial wastewater (Czech Environmental Information Agency, 2021). These indirect discharges of industrial wastewater are usually regulated by a contractual relationship. The sewerage network operator sets quality limits for discharged wastewater. Exceeding sewerage network limits is often fined by the sewerage network operator. These limits cannot be legally confirmed or controlled due to the lack of legal instruments, except for a narrow list of specific pollutants specified by the Act No. 254/2001 Coll. Water Act. The only possible way to set limits of full range of indirect discharges of industrial wastewater is if the industrial installation carries out industrial activities listed in Annex 1 of the Integrated Prevention Act.

The purpose of our study is to characterize indirect discharges of industrial wastewater from installations covered by the Integration Prevention Act and evaluate the possibility of setting limits for indirect discharges of industrial wastewater to the sewerage network by an integrated permit. The area of the capital city of Prague, which is characterised by a specific sewerage system, was selected for this assessment. The issue of indirect discharge of industrial wastewater in the Czech Republic has not been published in any study so far, except for a pilot study on the city of Kladno, which the authors presented in 2022 (Keprtová, 2022).

Several laws deal with the indirect discharges of wastewater into the sewerage system in the Czech legal system. Act No. 254/2001 Coll., the Water Act and on Amendments to Certain Acts (the Water Act), defines in section 16 the obligation to permit the discharge of wastewater containing particularly hazardous pollutants into sewerage systems. Particularly hazardous harmful substances are organohalogen compounds, organophosphorus compounds, organotin compounds, substances or their degradation products (which have been shown to have carcinogenic or mutagenic properties), mercury and its compounds, cadmium and its compounds, persistent mineral oils and persistent hydrocarbons of petroleum origin, and persistent synthetic substances. These are compounds that are not produced by common industrial activities, and therefore the adoption of this law for the purpose of setting conditions for monitoring indirect discharges is minimal.

Act No. 274/2001 Coll., on Water Supply and Sewerage, requires owners or operators of sewerage networks to draw up regulations on the sewerage system. The implementing regulation to this Act, Decree No. 428/2001 Coll., proposes only indicative permissible levels of pollution of industrial wastewater discharges into sewers and their concentration limits, but in sewerage system regulation, these can vary. The actual laws and regulations of the Czech Republic do not content specific requirements for general indirect wastewater discharges.

An integrated approach to environmental protection is enshrined in Directive 2010/75/EU of the European Parliament and of the Council on Industrial Emissions of IEDs, which was transposed into Czech law by Act No. 76/2002 Coll., on Integrated Prevention and on Pollution Control, on the Integrated Pollution Register and on the Amendment of some Acts (the Integrated Prevention Act). Integrated Pollution Prevention and Control (IPPC) is a set of measures aimed at reducing pollution, emissions to individual components of the environment and reducing waste, or its further use, not only by end-of-pipe technologies, but especially preventive measures. The purpose of the IPPC is to regulate the industrial and agricultural activities listed in Annex 1 of the Integrated Prevention Act. In general, installations covered by the Integrated Prevention Act can be characterized as large industrial installations. The result of the application of the integrated approach is an integrated permit (IP), which replaces individual component permits and is issued by the relevant regional authority (Ministry of the Environment of the Czech Republic, 2021). The regulation is applied to ensure a high overall level of environmental protection. This is achieved by choosing the suitable production processes and technologies that are the most environmentally friendly and at the same time applicable in the given industry under economically and technically acceptable conditions (Santonja and Karlis, 2020). These technologies are referred to as Best Available Techniques (BAT), which are contained in the Reference Document on Best Available Techniques (BREFs). BREFs, as summaries of European best available techniques, are uniform for all EU Member States and, in addition to individual BAT, also contain BAT-associated emission levels (BAT-AELs) that are decisive for setting emission limits in an IP. The up-to-dateness of the reference documents is ensured by regular revision, the revised version of the BREF also includes BAT conclusions, which are legally binding, and a derogation can only be requested from BAT-AELs.

As mentioned above, the binding conditions for the operation of an installation under the scope of the Integrated Prevention Act are based on BREFs and BAT conclusions (Evrard et al., 2018). Specific emission limits for indirect wastewater discharges, referred to as BAT-AELs to BAT conclusions, are not available for all categories listed in Annex 1 of the Integrated Prevention Act. In cases where BAT-AELs for indirect wastewater discharges are not specified, limits are set by the contractual relationship between the wastewater producer and the sewerage network operator by the sewerage regulations.

BAT-AELs for indirect wastewater discharges have so far been reported in six revised BREFs, resp. BAT conclusions, specifically BREF for the tanning of hides and skins, waste incineration, waste treatment, ferrous metals processing industry, textiles industry and BREF for surface treatment using organic solvents including preservation of wood and wood products with chemicals.

Methods

Prague is the capital and the largest city of the Czech Republic with a population over 1.3 million inhabitants on an area of 496 km^2. The metropolitan area is home to 2.6 million people. Prague is situated in Central Bohemia and the river Vltava flows through it. Vltava springs in the Bohemian Forest near the German border and is the longest river of the Czech Republic

Prague is characterised by a specific sewerage system. The central part of Prague is drained by a unified sewerage system and is led to the central wastewater treatment plant. Since the 1960s, separate sewerage systems have been built in the peripheral localities and localities of housing construction in the south and southwest of the city. Wastewater generated in the city is treated by one central wastewater treatment plant (CWWTP) and 20 side-plants. The central wastewater treatment plant is situated on Cisarsky Island on the river Vltava. In 2016, the CWWTP Prague treated approximately 93% of wastewater from the total production of the city. The rest, about 7% of wastewater, was treated in small side WWTPs located on the periphery of the capital city. In terms of pollution (relative to the BOD_5 indicator) produced in the capital city of Prague, the share brought in 2016 to the CWWTP Prague was 94% of the total load and 6% at the side WWTPs. The side WWTPs have their local sewerage network, which is not connected to the central Prague sewerage system (Pražská vodohospodářská společnost, a.s., 2021).

CWWTP was built in the 1960s and replaced the wastewater treatment plant in Bubenec. CWWTP consists of two water lines with a total capacity of 2.4 million p.e. (people equivalent) (Diaz-Sosa et al., 2020). Both parts of CWWTP are mechanical-biological wastewater treatment plants. The existing water line has about 96–98% COD and BOD_5 removal efficiency, but removal efficiency of total nitrogen is about 70–80%. The second water line was built according to the City Council decision to reduce the load of wastewater towards the existing water line. The new water line was put into operation in September 2018. Compared to the existing water line, the efficiency of removing total nitrogen by the new water line is up to 89%. The new water line is completely covered because of total flood protection and immediate restart after floods, and because of aesthetical appearance of the site near Prague's historical centre (Wanner et al., 2021).

The side WWTPs differ in size but the treatment process is similar in all 20 WWTPs. Basically, side WWTPs are mechanical-biological with denitrification and nitrification sections and with chemical phosphorus precipitation of treated wastewater (Pražské vodovody a kanalizace, a.s., 2021). For the purpose of this study, it is necessary to mention side WWTP in Miskovice, which is the largest of all 20 WWTPs. The original biofilm WWTP was replaced by conventional mechanical-biological in the 1970s. The last reconstruction in 2017 extended its capacity to 31 000 p.e. Effluent is discharged into the Cervenomlynsky stream (Pražská vodohospodářská společnost, a.s., 2015).

In addition to side WWTPs, there are other wastewater treatment plants in Prague, such as WWTP of Václav Havel International Airport in Ruzyne. Effluent is discharged into the Uneticky stream (Letiště Praha, a.s., 2020).

Sewerage regulations of WWTPs in Prague consist of sewerage description, WWTP description, inlet and effluent characteristics and list of industrial wastewater producers with individual limits.

The list of installations within the scope of the Integrated Prevention Act is accessible to the public, including individual permits and their amendments by the IPPC information system (IS IPPC) (Ministry of the Environment of the Czech Republic, 2022). IS IPPC is administered by the Ministry of the Environment of the Czech Republic and relevant information about installations are published by

the regional authorities. This study in based on information published in IS IPPC. Operating installations (installations with valid IP) were searched only in Prague region. All accessible documents were studied to define the list of installations which are discharging industrial wastewater into sewerage network. Individual installations are anonymised, only the type of industrial activity is indicated.

To define specific limits for indirect wastewater discharges according to the Integrated Prevention Act, all available BAT conclusions were reviewed. BAT-AELs for indirect wastewater discharges were published in six BAT conclusions but more are about to be published.

Information collected from IP was compared to the published BAT conclusions to define possibilities of setting indirect wastewater discharge limits by IP (European Commission 2022).

The limits of this method are given by accessibility of the IP and operational documentation of each installation. Where the data are unavailable, an installation operator could be involved in research, but the willingness to cooperation differs. Another limiting aspect is the inaccessibility of the contract between the sewer network operator and the wastewater producer. In the case of Prague, the producers of wastewater that is discharged into the sewage network are listed in the sewage regulations. However, it is not possible to determine the amount of the fine for violating the conditions for the discharge of wastewater or other details defined in the contract.

Results and Discussion

In the region of Prague, IS IPPC records 25 IPPC installations with a legal permit according to Act No. 76/2002 Coll., the Integrated Prevention Act. Industrial activities of installations as well as the form of industrial wastewater discharging were determined (*Table 1*). Municipal discharges and rainwater discharges into sewerage network are not considered. Cooling water and brine are referred to as industrial wastewater.

Four types of wastewater discharges were classified. Direct discharge into a receiving water body was not identified in any of IPPC installations. Some of the industrial processes do not produce wastewater, such as cement production, building bricks production, or technical gas production. If the flue gas treatment system is not based on the use of water or cooling water is not treated, then wastewater is also not produced during waste incineration or energy and heat production. The external WWTP collects wastewater from different producers and wastewater is transported to the external WWTP by a tank truck. The use of external WWTP for industrial wastewater is suitable in the case of insignificant wastewater production or in the case of concentrated wastewater containing substances that cannot be discharged into the sewerage network. In the case of IPPC installations, this involves wastewater produced by the liquid waste treatment station and landfill leachate.

Indirect industrial wastewater discharging is relevant in 18 of 25 installations. Approximately 83% (15 installations) of IPPC installations indirectly discharge wastewater into the sewerage system ended by CWWTP. Miskovice WWTP is treating wastewater from 2 IPPC installations. Only one IPPC installation discharges into the sewerage of WWTP of Václav Havel International Airport.

Table 1. *IPPC installations and types of discharges*

Industry/Type of wastewater discharges	Direct	No discharges	External WWTP	Indirect
Energy industries		1		6
Food, drink and milk industry				4
Chemical industry		1		2
Mineral industry		2		
Production and processing of metals				3
Waste management		1	2	3
Total	0	5	2	18

The energy industry with indirect discharges has the largest share in IPPC installations. In case of Prague, all installations include heating plants, which require high quality water. For this purpose, they are equipped with a water treatment plant which is the main source of wastewater. Another source of wastewater involves boiler blowdown wastewater. During boiler blowdown, water is discharged from the boiler to prevent the concentration of impurities during the continued evaporation of steam. All heating plants pre-treat wastewater by neutralisation.

Commission Implementing Decision (EU) 2021/2326 of 30 November 2021, establishing best available techniques (BAT) conclusions, under Directive 2010/75/EU of the European Parliament and of the Council, for large combustion plants does not contain individual limits for indirect wastewater discharge; therefore, the limits and their observance are within the competence of the sewerage network operator.

The food, drink and milk industry has a long tradition in the city. Wastewater produced in this type of industry consists of cleaning and sanitation water, which contains a cleaning medium and residual of products, for example sugar, fat, or milk. For each cleaning process, acid or base is used as needed. The installations are three beverage production plants and one dairy plant. All installations are in space-limited areas, and except for the dairy plant, wastewater is pre-treated by neutralisation, and no biological treatment is applied.

Commission Implementing Decision (EU) 2019/2031 of 12 November 2019 establishing best available techniques (BAT) conclusions for the food, drink and milk industries, under Directive 2010/75/EU of the European Parliament and of the Council does not contain individual limits for indirect wastewater discharge; therefore, the limits and their observance are within the competence of the sewerage network operator.

Metal production and processing installations produce wastewater from water treatment and rinsing water from surface treatments. Rinsing water can contain heavy metals, cyanides and organic contaminants. All considered installations pre-treat wastewater by neutralisation. The Surface Treatment of Metals and Plastics BREF has not yet been revised. The limits and their observance are within the competence of the sewerage network operator.

The chemical industry is represented by the pharmaceutical industry. Wastewater produced by pharmaceutical production is batch-based and consists of cleaning water. Both plants are equipped with WWTP for pre-treatment. One installation uses biological WWTP and the other mechanical/chemical WWTP based on neutralisation, coagulation and adsorption.

The pharmaceutical industry is included in the Manufacture of Organic Fine Chemicals BREF and has not yet been revised. The limits and their observance are within the competence of the sewerage network operator.

Waste management installations are divided into two groups. Two installations treat water-based liquid waste and one is a waste incineration plant. Waste treatment plants receive liquid waste and treat it by physical and chemical techniques. Process outcomes consist of sludge and wastewater, which is released into a sewerage system. These installations are, in fact, mechanical/chemical WWTPs. Both of the installations are de-emulsification stations treating liquid wastes containing oil substances. Initially, the free oil phase is skimmed from the surface, subsequently flocculation and coagulation agents are added, and finally, the water-based phase is neutralised and then disposed into the sewerage system.

Commission Implementing Decision (EU) 2018/1147 of 10 August 2018 establishing best available techniques (BAT) conclusions for waste treatment, under Directive 2010/75/EU of the European Parliament and of the Council sets BAT-AELs for indirect discharges to a receiving water body specific for different waste treatments. Special attention, as shown in *Table 2*, is paid to the treatment of water-based liquid waste and concentration of heavy metals.

The waste incineration plant uses water for flue gas cleaning; however, used water from the incineration plant is transferred into a dryer and is not disposed. The main purpose of the dryer is to evaporate water from the supplied depleted lime suspensions of the wet stage of flue gas cleaning (insoluble salts and metal hydroxides formed as wet lime scrubbing reagents). The depleted lime suspensions in the wastewater are fed to the spray dryer in a rotating atomiser, which sprays the suspensions into the hot flue gases leaving the boiler. Prague waste incineration plant generates hot water and steam, which are delivered into Prague heating system, hence wastewater is generated by a water treatment station, boiler blowdown and slag cooling water, wastewater pre-treatment is provided by sedimentation and neutralisation.

Although Commission Implementing Decision (EU) 2019/2010 of 12 November 2019 establishing the best available techniques (BAT) conclusions, under Directive 2010/75/EU of the European Parliament and of the Council, for waste incineration sets BAT-AELs for indirect emissions to a receiving water body produced during flue gas cleaning and bottom ash treatment, Prague waste incineration plant does not produce wastewater by these processes. Therefore, BAT conclusions cannot be applied for this installation. Indirect discharge limits and their observance are within the competence of the sewerage network operator.

Table 2. *BAT-AELs comparison with sewerage system regulations limits for liquid waste treatment*

Substance/Parameter	BAT-AEL ([1,2]) Treatment of water-based liquid waste	Limits set by sewerage system regulations
Hydrocarbon oil index (HOI)	0.5–10 mg/L	3 mg/L
Free cyanide (CN^-) ([3])	0.02–0.1 mg/L	0.1 mg/L
Adsorbable organically bound halogens (AOX) ([3])	0.2–1 mg/L	0.1 mg/L
Arsenic (expressed as As)	0.01–0.1 mg/L	0.1 mg/L
Cadmium (expressed as Cd)	0.01–0.1 mg/L	0.02 mg/L
Chromium (expressed as Cr)	0.01–0.3 mg/L	0.1 mg/L
Chromium VI (expressed as Cr (VI))	0.01–0.1 mg/L	0.05 mg/L
Copper (expressed as Cu)	0.05–0.5 mg/L	0.1 mg/L
Lead (expressed as Pb)	0.05–0.3 mg/L	0.05 mg/L
Nickel (expressed as Ni)	0.05–1 mg/L	0.05 mg/L
Mercury (expressed as Hg)	1–10 µg/L	5 µg/L
Zinc (expressed as Zn)	0.1–2 mg/L	2 mg/L

([1]) The averaging periods are defined:
— in the case of continuous discharge, daily average values, i.e. 24-hour flow-proportional composite samples;
— in the case of batch discharge, average values over the release duration taken as flow-proportional composite samples, or, provided that the effluent is appropriately mixed and homogeneous, a spot sample taken before discharge.

([2]) The BAT-AELs may not apply if the downstream waste water treatment plant abates the pollutants concerned, provided this does not lead to a higher level of pollution in the environment.
([3]) The BAT-AELs only apply when the substance concerned is identified as relevant in the waste water inventory.

Czech legal system has no policy for public monitoring quality of industrial indirect discharges, except a very narrow list of specific pollutants. The only possibility is application of BAT-AELs described in relevant BAT conclusions. The aim of this study was to compare and evaluate indirect wastewater discharges of IPPC installations in Prague with BAT conclusions.

Reports of 25 IPPC installations were investigated, and 18 of these installations release industrial wastewater into sewerage system. According to the collected data, all the studied installations are equipped with a wastewater pre-treatment unit. In major cases, neutralisation is applied, and in some cases, neutralisation and extra steps of sedimentation, coagulation, or adsorption are involved. The treatment of wastewater by neutralisation helps to protect the sewerage system pipes. When coagulation or adsorption is applied, wastewater pre-treatment protects WWTP by lowering the organic pollution concentration. Unfortunately, only one installation is equipped with their own biological WWTP. Using biological treatment is not necessary in all described installations but in some instances it would be desirable. Such cases are food, drink and milk installations, or underestimated metal production and processing plants, which produce wastewater with a high load of organic pollution (Gartiser et al., 2010). Absence of a biological stage of wastewater treatment is mainly due to limited availability of the necessary space in areas of installations. Organic pollution is not a considerable problem in the period of heavy rainfall, because the sewerage network of central Prague is unified with rainwater drainage, which dilutes wastewater stream. But during the dry season, WWTP could be endangered by wastewater with a high content of organic pollution. Large fluctuations in the quality of the inlet affect the biological treatment and might cause a deterioration of the quality of the effluent.

Due to the existence of a contractual relationship between the wastewater producer and the sewerage network operator, it is not possible to determine from the available sources whether the limits set by the sewerage regulations are complied with or not. Violation of the sewerage regulations is defined by a contractual

penalty. Misdemeanour of the conditions of the sewerage regulations cannot be controlled by an expert executive body of the state administration (The Czech Environmental Inspectorate), due to the impossibility of interfering with the contractual relationship.

A comparison with the published BAT conclusions revealed that the coverage of the BAT-AELs for indirect discharges is insufficient for industrial installations in Prague, as insufficient attention is paid to the indirect discharges generally. BAT conclusions are available for three of the five industry sectors that represent IPPC installations in Prague. Indirect discharges and their governance are not included in BAT conclusions for large combustion plants (energy industry) and the food, drink and milk industries. The second mentioned installations are often located near urbanised areas to ensure the supply of fresh products without traveling long distances and at the same time producing wastewater contaminated with organic compounds, which requires treatment. From this point of view, BAT-AELs for indirect discharges from food and drink production appear to be appropriate or even necessary.

The BAT conclusions for waste management set not only the limits for indirect wastewater discharges, but also the obligation of a minimum frequency for monitoring of individual parameters. BAT conclusions for waste treatment specify BAT-AELs for indirect discharges to a receiving water body for different waste treatment processes. The limits are relatively strict because the levels are the same for direct discharge and indirect discharge. This means that BAT conclusions require the same quality of wastewater, which is discharged directly into the water body as into the sewerage system. Compliance with BAT-AELs is not an issue for installations in the territory of Prague, since the limits set by the sewerage system regulations correspond with the BAT-AELs. Unlike BAT-AELs for direct discharges, BAT conclusions BAT-AELs for indirect discharges do not specify an organic pollution content parameter, which is often neglected. BAT conclusions for waste incineration approach indirect discharges similarly to the BAT conclusions for waste treatment; set BAT-AELs and a minimum frequency for monitoring of these parameters. Indirect discharges are only considered for wastewater generated by flue gas cleaning or bottom ash treatment. The waste incineration plant in Prague does not produce such wastewater. Water polluted during flue gas cleaning is transferred into dryer and evaporates. Wastewater produced in Prague's waste incineration plant is associated with production of heat. BAT conclusions do not content BAT-AELs for this type of wastewater; therefore, BAT-AELs for indirect discharges are not suitable.

Conclusion

In this study, we focused on indirect discharges of industrial wastewater produced by IPPC installations in the city of Prague. Most of these IPPC installations release industrial wastewater indirectly – into the sewerage system. Due to the current legislation, it is not possible to monitor the quality and quantity of industrial wastewater discharged into the sewerage system. Conditions for discharging are within the competence of the sewerage system operator and cannot be controlled by any public authority. Indirect discharges can only be controlled if the Integration Prevention Act is applied, and the BAT conclusions contain BAT-AELs for indirect discharges to the receiving water body. Relevant BAT-AELs are not included in all valid BAT conclusions. The inconsistency of indirect discharges leads to the monitoring of only a few industrial sectors. The study indicated only two installations covered by BAT conclusions with relevant BAT-AELs for indirect discharges to the receiving water body. These installations are waste treatment plants. According to the results of this study, indirect wastewater discharges are poorly covered by the IPPC legislation.

In addition to installations that do not cover BAT conclusions or are not covered by the Integrated Prevention Act, many small and medium-sized production enterprises in the territory of Prague have their indirect discharge provided only by a contractual relationship with the sewerage operator. No BAT conclusions can be applied to these small and medium sized installations, and therefore the possibility to monitor the quality of indirect discharges and the administration of discharges by the state authorities depend on national legislation change. Unfortunately, such change is not expected.

Including the monitoring and limitation of indirect discharges in the competence of state administration bodies would enable the enforcement of higher environmental protection, as well as transparency of conditions for discharges and a uniform approach to permitting and monitoring of indirect discharges of industrial wastewater.

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