

Proposal for amendments of the EU Urban Wastewater Directive

The Swedish Water and Wastewater Association (Svenskt Vatten) urge for the EU Urban Wastewater Directive (91/271/EEC) – UWWD – to be opened and amended. The directive has very successfully improved water quality within the EU but does not any longer drive environmental benefits to the extent necessary and in relevant ways. The directive is in some respects problematic. Other parts of it are important to preserve or develop.

As a basic principle, the UWWD should regulate minimum requirements on treatment of wastewater from agglomerations. Complementary requirements should be based on the EU directives for the marine and aquatic environments (the Water Framework Directive 2000/60/EC and the Marine Strategy Framework Directive 2008/56/EC). The latter requirements should be decided nationally due to needs addressed in the Programmes of Measures under those directives.

In this paper we present and explain why we propose some requirements to be amended and others preserved. Our proposals are further elaborated and explained in the Annexes 1, 2 and 3.

Most urgent - first priority issues

Ensure that environmental protective wastewater treatment facilities may expand.

The population in an urban area can continue to grow when its UWWTP has already taken all possible treatment technology. The leakage of water into the pipes may also have been corrected as far it is possible. If an alternate recipient is then missing, it must be legally ensured that an extension of the treatment plant will be permissible even though the recipient's quality requirements on single elements according to the Water Framework Directive or the Marine Strategic Framework Directive cannot be met. Today this is not possible due to the non-deterioration-principle and the Weser-ruling and how the UWWD refer to these directives. The alternative to non-permissibility is to accept a much more deteriorated water quality as neither the population in the agglomeration can be prevented from increasing nor can the wastewater from it be stopped.

The best legal solution is to adjust the directives on marine and aquatic environment and making it possible to grant an exemption from them. See proposal in Annex 3.

Regulate considerably stricter requirements on emissions of phosphorus to phosphorus sensitive areas (e.g. the Baltic Sea) but review the criteria for sensitivity. Much stricter emission requirements can be set on Urban Wastewater Treatment Plants (UWWTP) to such areas. The emissions can without technical problems be halved (90% reduction requirement) and halved once again (95% reduction requirement) compared to the current requirements in the UWWTD. Emissions of phosphorus from the largest plants are possible to reduce even more. The criteria for phosphorus sensitivity in the directive's Annex II need to be revised and refer to how the directives for marine and aquatic environments define eutrophication. Assessments made under those directives should define which limit value regulated in the UWWTD to that should be applied on emissions to eutrophicated areas.

Very urgent – second priority issues

The directive must equate naturally cold wastewater in northern Europe with cold wastewater on high altitudes in other parts of the EU. The exception due to cold climate from the current directive's requirement on treatment of biological oxygen demanding substances is delimited to be applied only on agglomerations located at least 1 500 m above the sea level. But it's just as cold or even colder at the sea-level in the northernmost parts of Europe.

A condition for applying such an exception should be that the water must be cold due to the local climate only. It must not be made an opportunity to first recover the heat contained in the wastewater and by that made possible to escape from the treatment requirement.

Keep the definition of industrial wastewater in Article 1.3. The definition is still relevant.

Retain or strengthen current upstream requirements on connected industries wastewater.

Setting requirements on the upstream of the urban treatment plant affiliated industries is a basic prerequisite for good wastewater treatment and circular economy. The principle of rectifying pollution at source is enshrined in Article 191 (2) of the Treaty on European Union's Treaty on the Functioning of the Union. The sewage directive's upstream requirements should apply to all industrial activities that may affect compliance with other EU directives, unless the corporation responsible for the treatment plant agrees with the actual industry to treat the polluting substances.

The requirements in Article 11, as well as those in Annex 1C to which the Article refers, should be retained. They are needed to ensure that measures at source are taken in accordance with Article 191 (2) of the EU Treaty and that businesses with industrial wastewater should not be able to avoid such requirements that their competitors outside the agglomerations have to accept. Urban areas must not be industrial-non-requirement-zones. Upstream requirements reduce the risks from urban emissions to violate the objectives of Article 4 in the Water Framework Directive. See also EEA Report No 23/2318 Industrial wastewater treatment - pressures on Europe's environment.

Retain current basic requirements related to sludge. The requirements in Article 14 (1) - (2) and the prohibition in Article 14 (3) should be retained as well as the requirements of Annex 1C.

Regulate a possibility for a later introduction of a basic requirement on advanced treatment of micropollutants (pharmaceuticals) and the conditions for introduction of such a requirement. The time is not yet mature for an immediate introduction of requirements in the UWWD on advanced treatment of micropollutants. A requirement of that kind must meet a stated need for it and a method for assessing such a need must be available. Therefore, the directive should regulate a special committee with a mandate to decide on a requirement for advanced treatment according to a UWWD-regulated decision procedure. The conditions also regulated in the UWWD has to be fulfilled. The requirement can then be set in due time without opening the directive once again. Since the UWWD is a minimum directive, the conditions should delimit such a requirement:

- to UWWTP for more than 150 000 pe with a discharge affecting interstate marine areas or waters being found sensitive to micropollutants or to a drinking water source.
- the UWWD should, if possible, refer to assessment carried out under the directives on marine and aquatic environment to define waters being affected or sensitive to micropollutants.
- treatment requirements for discharges from smaller UWWTP than 150 000 pe or affecting other marine areas and waters should be regulated nationally and not in the UWWD.
- the advanced treatment technique on micropollutants must be well established and tested, and
- methods for assessing sensitivity and standardized analyzes to control appropriate emission requirements in the outlets from UWWTP must be available.

Since there are different types of sewage systems, only those minimum requirements should be set that are possible to implement everywhere. The system of conduits is by far the most expensive part of the wastewater facilities. Modern wastewater systems conduct contaminated wastewater and stormwater or run off water in separate pipes – a duplicate system. Only wastewater is conducted to the UWWTP. In older systems the wastewater pipes contain a mix of these two types of water. The EU countries have different systems and varying degrees of systems – from 100% duplicate systems to 100% combined systems. The issue is complex with many dimensions and measures can be very expensive, affecting urban planning etc. without necessarily responding to a reasonably proportional benefit. See also text on maintenance below.

Secure financing for reinvestment and maintenance of existing wastewater facilities. The directive should set appropriate but not detailed requirements on this. Unless the status of the already existing facilities is not maintained, more environmental benefit will be lost from 30 - 50 years of environmental investments than is possible to gain by new requirements triggering new investments. By maintaining the status of, for example, the sewage pipes, the leakage into the pipes is kept down, which reduces the volume of wastewater transported to the UWWTP, which improves the treatment and reduces the discharge from the agglomerations via the UWWTP. The risks for combined sewage overflows are reduced as well.

Urgent – third priority

Clarify and adjust the concept of maximum average weekly load (max AWL) and delineate it to make the applicability more precise. The size of an agglomeration determines how much pollution is generated as a load on the UWWTP. The single week during a year when the agglomeration reaches its maximum size measured as a pollution load is relevant to determine as the basic ground for which emission requirements should be applied and for knowing how to dimension the treatment plant. But the size of the agglomeration cannot be derived by measuring concentrations of BOD in wastewater. BOD change during the transport to the UWWTP and the method for analyzing BOD is extremely uncertain. On top of this, the Commission has applied the concept in a misleading and irrelevant way imposing large administrative burdens to respond to requests on unnecessary data and information and for reporting. This must be prevented.

Simplify the rules and reduce bureaucracy by reducing detailed regulations. Apply the [EU Better regulation Policy](#). The European Commission monitors how requirements and other criteria are applied by requesting data and evidence on every detail. The result is an extensive bureaucracy that can only be limited by a simplified regulation. It is especially necessary to do so if the UWWTP's requirements should be made applicable on wastewater facilities smaller than those for 2000 pe.

Other issues

Make the emission requirements stricter just by specifying the emission levels more stringent. An emission level of 1,0 mg phosphorus/liter is a 29% stricter requirement than 1 mg/liter and is a driver for enhanced internal control and routines for operational maintenance of existing technology in use.

However, due to e.g. legal aspects should levels below 0,5 mg/liter be stated with only one decimal and the BOD level should be stated without decimal because the BOD-analysis is very uncertain (+/- 30%). This is necessary also for adapting the requirements to differences in the Member States' penalty systems.

Regulate emissions and the analysis of Biological Oxygen Demands as BOD7 or as both BOD5 and BOD7. In the start of an infringement case against Sweden, the European Commission questioned our regulation and control of BOD₇ instead of BOD₅. It is an unnecessary ambiguity and meaningless dispute that should be resolved in a revised directive to avoid reoccurrence. Both parameters give the same emission results when the emission level is matched to the method for analysis. The number of days the analysis is in progress must be able to adapt to the Member states' varied working time laws, transport times from UWWTP in sparsely populated areas to laboratories and to other circumstances.

Abolish the COD emission- and control requirements (Chemical Oxygen Demands). COD is an outdated parameter for a plant's emissions. The results from the analysis provide no information on what should or has to be changed within the plant.

Annex 1

Elaboration of our proposals

Most urgent issues – first priority

• **Expansion of environmental protection wastewater treatment plants must be permitted.** The population in an urban area can continue to grow when the local treatment plant has already taken all possible purification technology and other measures to neutralize an increasing population's impact on the environment. See example in the box.

According to the EU Court's Weser-ruling, Article 4 of the Water Framework Directive shall be fully applied on all individual projects and activities, including the two exceptions available in the article. The waterbody's quality must never be deteriorated, not even regarding a single substance (quality element).

An example

- an UWWTP emissions show far better reduced when compared with the UWWTD requirements and there is no more technologies to introduce to improve treatment of phosphorus further or to reduce impacts from the discharge on other quality element defining ecological or chemical status,
- all technical measures possible to take on the sewage system are already taken,
- the population and the wastewater volumes continue to grow. The UWWTP must be expanded (Article 10, UWWTD),
- emission sources upstream the UWWTP create a load of phosphorus on the same recipient as well as on downstream waterbodies,
- the recipient's status on phosphorus is good or moderate and is at risk to deteriorate due to the increased emissions from the growing population, and
- there is no other recipient available to bear the emission and the outlet is not possible to move downstream due to an existing drinking water source.

From the example presented in the box above, the UWWTP is not possible to allow by applying the exception "less stringent quality requirements" (Article 4.5) on the recipient's water. This is prevented by condition c (no further deterioration of status occurs) in the article 4.5 as the population will continue to grow. Article 4.7 regulate a possibility to deviate from the Water Framework Directive's requirements but is only applicable when a discharge is made to a recipient assessed to have high ecological status (classified to be better than good). The possibility to apply a "time exception" in accordance with Article 4.4 and then to postpone when good ecological status will be achieved offers no solution as the population grows. Moving the discharge point downstream is prevented by Article 7 in the Water Framework Directive, which is meant to protect drinking water sources.

According to Article 7 in the UWWTD the treatment must be appropriate. Article 2.9 of the same directive defines the concept of "appropriate treatment" as the environmental quality requirements in, e.g. the directives on marine and aquatic environment must be fulfilled.

All requirements of all EU directives must be fulfilled if there is no explicit provision that something else applies. But due to the example above, this is not possible to fulfil. It is not possible to require the UWWTP to expand and at the same time prohibit such an expansion.

The technological development that occurred was probably not foreseen when the UWWTD and the Water Framework Directive were designed in the 1990s, but Europe's population will continue to grow. The directives need to be amended to make it possible to apply both at the same time. It will take many years before they are reviewed once again. In the first instance, Article 4.7 of the Water Framework Directive should be amended to secure wastewater treatment plants permissibility. If this does not happen, an exemption should apply in the UWWTD. See our proposals in Annex 3 for supplementary paragraphs. The requirement on "appropriate technology" must not prevent an UWWTP to expand and adapt to an increased urban load.

• **Emission requirements for primarily phosphorus to areas eutrophicated areas or areas being sensitive to phosphorus (e.g. the Baltic Sea) should be much stricter.**

Compared with the current requirements, allowed emissions of phosphorous from the largest UWWTP's in Europe should be reduced by at least half (90% reduction) or to a quarter (95% reduction) of the present or perhaps even more strict.

The UWWTD requires only 80% reduction of phosphorus or an emitted concentration of 1 mg/liter (agglomerations for more than 100 000 person equivalents) or of 2 mg/liter (agglomerations between 10 000 – 100 000 person equivalents). There are no emission requirements to be applicable on smaller agglomerations. There are no technical problems whatsoever to meet legal emission requirements of 0.3 mg/liter, also from UWWTP's for agglomerations with less than 10 000 person equivalents or from much smaller ones.

Sweden's territory is decided to be phosphorus sensitive according to Annex II in the present UWWTD. But all inland waters and lakes are not phosphorus sensitive and all seas are not nitrogen sensitive. In order to be able to tighten the emission requirements as the UWWTD's minimum level and to be able to justify it, the requirements must be correctly directed. Therefore, Annex II in the UWWTD should be revised or abolished. Instead, the requirements should relate to how eutrophication is assessed in accordance with the Marine Strategic Framework Directive and the Water Framework Directive.

Swedish UWWTPs reduces 96% phosphorus in average with an annual average level of 0,21 mg P/l in the outlet. Those with the best treatment technology reduce >98% or achieve a concentration in the outlet of 0,1 mg P/l as an annual average due to a permit condition of 0,20 mg P/l. The UWWTP located at the ski resort Bydalen with 3 000 pe recently received a permit condition of 0,30 mg P/l.

A tightening of the requirements in the UWWD to at least 0,50 mg P/l would be very reasonable as a basic requirement for all UWWTP with a load bigger than 2 000 pe. The requirements on large UWWTP for at least 150 000 pe should be made even stricter, from currently 1 mg P/l to at least 0,3 mg P/l and to 0,2 mg P/l, if a requirement on advanced treatment of micropollutants are introduced. Requirements on medium sized UWWTP should be tightened from 2 mg P/l to 0,3 mg P/l. See also the section below on advanced treatment.

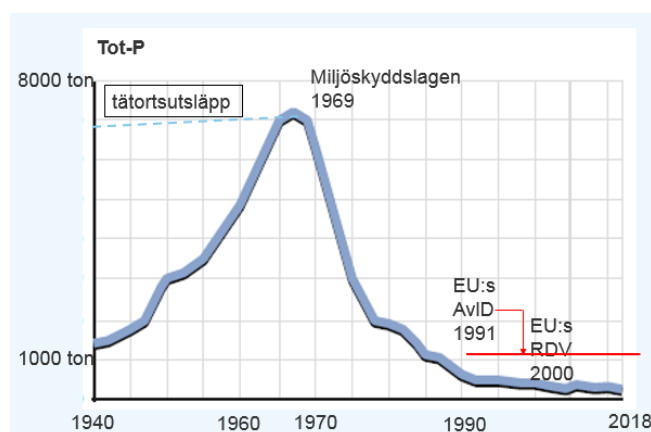
Agglomerations number of pe (person equivalents)	Requirements on emissions of phosphorus. Either must the requirement be fulfilled on reduction or as an average concentration during a year, measured in proportion to the flow from all outlets	
At least 150 000 pe*	97 %	0,2 mg/l
At least 10 000	95 %	0,3 mg/l
At least 2 000 pe	90 %	0,50 mg/l
200 – 2 000 pe**	80 %	1,0 mg/l

* The requirement should be applicable only when a requirement on advanced treatment of micropollutants is introduced.

** Such small UWWTP should not be regulated in the UWWD but if this will be a reality, only an emission requirement that can be easily implemented without unreasonable costs should be regulated.

The UWWD should leave to the Member States to decide whether the requirements are to be enforced by national regulations or mandatory individual permits or as a combination.

Sweden fulfilled by far the present UWWDs requirements on phosphorus emissions well before being a member in the EU in 1995 and before the UWWD was decided in 1991.



The figure is developed from a figure in the report "Avloppsvatten – rening av avloppsvatten i Sverige" issued by the Swedish Environment Agency in 2014.

AvD= the UWWD

RDV= the Water Framework Directive.

Miljöskyddslagen= the Law on Environmental Protection of 1969.

Very urgent issues – second priority

• **Re-formulate the requirements for treatment in cold water.** Since EU directives are often applied literally, the Commission follows up and applies every detailed requirement in directives as the requirement is formulated. The environmental benefits of implementing a claim in a single case may be lacking but still enforced only from formal motives. The current regulation on treatment of oxygen-demanding substances (BOD) has therefore caused demands for meaningless investments in several northern sparsely populated municipalities in remote parts of Sweden without any environmental needs what so all. These may cause revised tariffs that will increase costs for individual households by up to 30 % for investments in UWWTPs emitting a wastewater volume that constitutes very small parts of the flow in receiving rivers with water being very well oxygenated.

The directive's requirement for secondary treatment should continue to apply everywhere, but the exception for that should be revised. The exemption may currently be applied where the climate is cold only if the agglomeration is located at least 1 500 m above sea level. Some other environmental conditions must be met as well. When a wastewater is sufficiently cold, the biological methods required to treat BOD become less effective. The directive must consider that it is just as cold at the sea level in northern Europe.

The directive should clarify that the temperature should relate to the wastewater and not to the local climate or air temperature. On the same, the exemption may not be applied if energy has been saved by recovery of heat from the wastewater. Saving of energy may not be made negative to the aquatic environment.

The water temperatures in northern wastewater are often below six degrees in winter and sometimes considerably lower, and as a maximum of 12 - 13 degrees in summer. In other words, they are as cold as it is in a refrigerator, whose purpose is to keep microorganisms under control. Requirements in the UWWTD on the treatment of BOD should apply when the wastewater is cold, regardless of the altitude above the sea level. It should be possible to make exemptions from the BOD emission requirement at locations where the temperature of incoming water becomes low, e.g. below six degrees C. A complementary condition for applying the exemption could be that relevant biological water quality elements in the Water Framework Directive must not be affected.

Treatment of BOD at smaller villages or ski resorts in the mountains is carried out under circumstances different from those at other locations. At a ski resort in the mountains, the water is cold at the same time as the population is large during a limited time of the year, with a peak during one or maybe a couple of weeks. But microorganisms need time to grow to be effective in the UWWTP. During the rest of the year the water is warmer, but then the microorganisms are at risk getting too little "food" when the summer's small population generates small volumes of wastewater entering a treatment plant that is designed to meet the larger population at the winter season.

If the BOD is discharged from such a place to a large river far north or to a lake being able to recover from temporary oxygen deficiency, the environment is not long term affected. In such situations it should be possible to grant exemptions due to cold climate. However, if the discharge occurs to a lake being covered by ice for several months every year, there is a risk that oxygen deficiency reoccurs too often, thus having a noticeably negative effect on the lake's biology. In such a case, the emission of BOD does not meet the quality requirements of the Water Framework Directive and therefore no exemption should be allowed.

• **A revised directive should open for a later introduction of requirements for advanced purification of micropollutants, e.g. pharmaceuticals.** The EU has adopted a strategy for reducing emissions of pharmaceuticals. This emphasizes upstream measures but also points out the need for complementary downstream treatment (end-of-pipe).

Advanced treatment technology has been developed specifically for treatment of pharmaceuticals but can also reduce emissions of other organic pollutants. The pollutants are measured at very low concentrations, hence the collective name micropollutants.

Often, large UWWTP receive a large proportion of a country's total volume of wastewater. Large organizations have better financial power and technical expertise to cope with technologies for advanced treatment of micropollutants. A requirement on such treatment significantly increases costs and can be more easily borne by the population in large agglomerations. However, since a requirement may have major financial consequences it has to be based on an identified need.

If advanced wastewater were to be introduced in e.g. the 22 largest Swedish UWWTP each of them serving more than 100 000 inhabitants, then 55% of Sweden's wastewater volume would be treated. If advanced treatment would meet a need wherever these locations exist, a treatment requirement would still only create benefits locally and in coastal waters. The treatment will give a positive environmental effect in the sea basins if all similar UWWTP in all countries' surrounding the same sea basin introduce such treatment.

To provide the intended effect, advanced treatment of micropollutants requires a wastewater that is first treated from particles. By this, the requirement technically interacts with stricter requirements on emissions of phosphorus normally being adsorbed on particles. Consequently, the entire cost should not solely burden a requirement for advanced micropollutant treatment technology.

It is still too early to specify legal emission requirements that the technology be supposed to fulfill. Neither is there an accepted method or agreed criteria for identifying which sea or water area can be assessed to be sensitive to emissions of micropollutants such as pharmaceuticals.

If specific emission requirements are to be met, this presumes specified substances to be regulated which can be controlled, but there are 1000's of substances to choose from. Too often, standardized methods for analyzing these micropollutants are not available to make control of emissions of such organic substances in wastewater and of legal requirements possible. The analyzes are expensive. The environmental effect from individual substances as well as the environmental impact from mixes of substances are poorly mapped. Each substance is treated variously effective by a specific technology. Thereby, the treatment effectiveness on substances and mixes that have been found in a specific waterbody to be eligible to treat has to address which technology is suitable to be invested in. The technology chosen must as well fit into the design of the existing UWWTP.

Treatment techniques are available but are not yet ready to impose as a requirement. It would be desirable to be able to introduce a requirement according to the UWWD to protect those marine and aquatic environments needing it. Several prerequisites or conditions as follows must be met and they would be appropriate to regulate in the UWWD, being an EU minimum directive;

- a requirement for advanced treatment of micropollutants should relate to UWWTPs at agglomerations with a load from at least 150 000 inhabitants or pe. The same size of UWWTP is regulated in the EU Environmental Impact Assessment Directive (EIAD). According to EIAD, such UWWTP are always considered to have a significant environmental impact, and
- sufficiently reliable treatment technologies shall be available, and the wastewater shall be discharged to marine or aquatic areas whose biology is found to be sensitive to micropollutants, and
- a method or criteria for assessing sensitivity has been developed, and
- sensitive areas that may be eligible for regulation of a treatment requirement should be limited to drinking water resources (regulations for the protection of drinking water sources are provided for in Article 7 of the WFD), interstate marine and coastal areas and interstate surface water bodies on land, and
- the period for implementing the requirement should be at least 10 years.

The mandate and rules of the Implementing Committee already regulated in Article 18 in the UWWD should be developed. The Committee should be given a mandate to decide on advanced treatment requirements of micropollutants, if the conditions above are fulfilled. The conditions should be regulated in a separate article in the UWWD.

The decision procedure should be regulated in the present article 18 in the UWWD. The Committee and the procedure may correspond to that regulated in Article 21 (2) of the Water Framework Directive (see box next and annex 2). Decisions taken under such procedures are legally binding on the Member States.

Article 21 in the Water Framework Directive*Regulatory Committee*

1. The Commission shall be assisted by a committee (hereinafter referred to as "the Committee").
2. När det hänvisas till denna artikel skall artiklarna 5 och 7 i beslut 1999/468/ EG tillämpas, med beaktande av bestämmelserna i artikel 8 i det beslutet.

The period laid down in Article 5 (6) in Decision 1999/468/EC shall be set at three months.
3. The Committee shall adopt its rules of procedure.

Another example on delegated decisionmaking can be found in the EU Regulation 1305/2013.

• **The directive needs to consider that there are both modern and unmodern conduit systems and to set requirements based on locally identified needs.** In modern conduit systems, highly contaminated wastewater is transported in pipes to the UWWTP, separated from stormwater pipes leading stormwater to the recipient (separated or duplicated conduit systems). In the older systems, both wastewater and stormwater are transported in the same pipe (combined conduit system).

The modern systems dominate (about 90% of the conduit systems) in Sweden. The older ones are mainly found in old city centers or large cities. It is extremely costly and laborious to replace conduit systems and dig up cities when doing it. Such systems are therefore replaced gradually when opportunity arises. The requirements in the current UWWD from 1991 concern combined systems. In some member states they are most common, in others they are modernized.

Wastewater pipes being effectively separated from stormwater and well maintained do not overflow due to rain or melting snow. It is in the unmodern when wastewater and stormwater are mixed the risk from combined sewage overflow (CSO) increases during rainfall and snowmelt, with the result that the more polluted wastewater is being discharged from the pipes without treatment. In some EU countries > 5% of the wastewater volume is overflowed. The European Commission has reported to the European Parliament about improvements made on the conduit systems within the EU.

When large volumes of stormwater are led to the treatment plant, emissions increase and the efficiency of the plant decreases, partly explained by the wastewater is being colder and thereby more difficult to treat by biological technologies and partly because it gets less well treated when it too quickly has to pass through the basins inside the UWWTP. The wastewater is also at risk of being overflowed at or in close to the UWWTP.

As the amount of emissions is a result from multiplying the volume of treated wastewater (liters) with the concentration of pollutant (weight/liter), the emission from the UWWTP increases when it is raining and the conduit system is combined, even when the legal requirements on reduction or concentration in the outlet is met. The energy consumption increases when the volumes of treated wastewater treated increase.

Requirements on measures against wastewater (system change or wastewater treatment) should be driven from locally identified needs, given the large costs and consequences in urban areas. Measures should not be generally required everywhere. The requirement should therefore apply when it is established that the measure is necessary to protect a drinking water source in order to reduce need of improved treatment in drinking water production in accordance with Article 7 in the Water Framework Directive. It should also apply when overflow has been found to be a significant source of impact on bathing water quality under the Bathing Water Directive or under Annex II, paragraph 1.4 in the Water Framework Directive and the measure is therefore necessary to achieve such an environmental quality objective as set out in Article 4 of the same directive.

• **Ensure the reinvestment and maintenance rate of existing environmentally protective UWWTPs and secure financing.** New demands on the wastewater plants cost money, but unless the status of those already existing is maintained, more environmental benefit will be lost from 30 - 50 years of environmental investments than is possible to gain from new requirements. The EU has provided many billions of Euros in grants for implementation of wastewater systems. A clear legal responsibility on maintenance and reinvestments should be set on each Member State as an incentive to maintain EU-funded as well as nationally funded systems.

Additional water is water that leaks into wastewater, for example groundwater. Pipes are rarely able to get och maintain completely sealed as there are 10 000's of joints along them, the surrounding soil masses are moving, plant roots can penetrate, load from heavy vehicles above ground can damage them, the materials age and so on. But if maintenance is neglected, the volumes of cold stormwater from the urban area and water leaking into the pipes will gradually increase. The risks from over-flows, also in the treatment plant, will then increase. Neglected maintenance of aging combined pipes are most risky.

By performing a systematic work to maintain the sewage pipes' status, the leakage of water into the pipes will be reduced. Thus, the volume of wastewater in the inlet to the UWWTP will be reduced as well. This, in turn, reduces the agglomerations emissions of pollutants via the UWWTP, since the treatment requirements is formulated as a concentration in the discharged volume, but the emitted quantity depends also on the discharged volume of water. It is the emitted quantities and not the concentration that normally affect the status of the water body.

Article 10 in the UWWD only states that the sewage facilities must be operated and maintained to function satisfactory under all normal climatic conditions. That requirement is not strict enough. The directive needs to regulate the obligations of each Member State to have plans for maintenance and reinvestments and to have a financing system to ensure that the status of conduit systems and the UWWTP is maintained. This would be in line with what is expected under Article 9 of the Water Framework Directive on Water Pricing.

The purchase value of Sweden's present sewage system is in the order of SEK 500 billion (approx. 50 billion Euro). The conduit system is probably responsible for about 70% of that value. A wastewater pipe may cost up to about 5 000 SEK/meter (approx. 500 Euro/meter) in sparsely populated areas and up to 15 000 SEK/meter (approx. 1 500 Euro/meter) or more in urban areas and older city centers. It is more difficult to dig in densely populated city centers with traffic, buildings and lot of other considerations that must be taken. The size of the purchase value of Europe's sewerage system can only be divined.

Urgent issues – third priority

- **The use of the concept of maximum average weekly load (max AWL) needs to be clear and delimited.** Max AWL indicates the maximum load that an agglomeration's wastewater generates during a week. The load is reported as BOD5 (biological oxygen demand for five days) or BOD7 (for seven days). BOD is a measure on the amount of substances that are readily degraded biologically using oxygen. High BOD emissions in a sensitive recipient can cause oxygen deficiency. An amount of 60 g BOD5/day is regulated in the directive to correspond to one pe. A regulated amount of 70 g BOD7/day would also correspond to one pe.

The concept of max AWL can be best used in a theoretical calculation of the annual peak level for the number of person equivalents (pe) in the urban area for one week, whose pollution becomes a load at the UWWTP (generated load). The calculation needs to be done in order to determine which of the directive's emission requirements for BOD, phosphorus, nitrogen and so on are to be applied. It is correct to link the directive's requirements to the size of the agglomeration since the UWWTP protects the environment from it. If the requirements were linked to the size of the UWWTP, it would be possible to divide the agglomeration's wastewater on UWWTP and escape requirements. The more pe in the agglomeration, the more stringent requirements need to be applied in order to avoid overloading the environment.

A measurement value on BOD from the inlet (the entering load) does not correspond to the size of the agglomeration (generated load) described as pe. What the actual BOD load into the UWWTP looks like and what technical capacity the UWWTP needs to have in order to treat all wastewater during a max AWL must be distinguished from determining the emission levels based on the size of the agglomeration. In addition, BOD analyzes are very uncertain (+/- 30%) to work as a reliable baseline for determining the correct emission limit value.

The number of pe is based on a theoretical calculation which, according to the rules in the directive, means that one pe corresponds to 70 g BOD7/day. The actual figure may be higher or lower than the theoretical, depending on local life habits, the nature of the locality (industrial location, trade location, tourist location, commuting etc.) as well as on the type of conduit system and changes in and status thereof, water temperatures etc. The BOD-load from Swedish agglomerations in the inlet of UWWTPs can vary between 40g and 80g BOD7/p/ day. From several agglomerations, "entering load" has started to increase in recent years without an increase of the "generated load". So far, no explanation to it has been found, but it is not possible to exclude such factors as altered food or living habits or other things that the treatment plant cannot influence.

The directive's ambiguity on this opens for strange interpretations and problematic applications, e.g. in the EU Commission's monitoring of compliance to the directive.

It is inappropriate to apply the directive as the European Commission does when requiring reporting of max AWL from measured values of BOD in UWWTPs inlets. By using such data, the European Commission tries to derive the size of the agglomeration upstream of the UWWTP to check whether the correct emission requirements have been applied or not. But the method is misleading. The reporting requirement also creates unnecessary costs and other meaningless inconveniences.

For example, substances that are readily biodegradable begin to decompose as soon as they leave a property or a water closet in it. The degradation continues throughout the entire transport to the UWWTP, which in time may take less than one to 24 hours or even more, and it is at the beginning of the transport that the decomposition is most fast. It rings off after a few days. In long pipes and when the wastewater is transported slowly, the decomposition can go further than in short pipes or during fast transports. When the UWWTP at, e.g. an agglomeration with a lot of industries, begins to serve several scattered small villages far away, not only do the length of the pipes grow, the actual BOD load from the settlement in total is affected as well. In such an example, the size of the agglomeration described as pe, will be reported to be smaller than it is.

Another example is whether a municipality is modernizing or renovating its conduit system, which is positive to the environmental protection. Such a measure may affect the previously measured BOD7-data at the inlet, e.g. if the entering wastewater has previously been mixed with much other water that disappeared when the measure was taken. Then the water temperature may have increased, which may in turn increase the rate of degradation of BOD. If the volume of wastewater has decreased, the flow rate may also have decreased resulting in an increase of transport time causing a decrease of

BOD. If the value of the incoming BOD falls, it appears as if the size of the agglomeration has decreased despite being unchanged.

A third example is if samples are taken during the week when the flow increases again after a dry period or a period with low wastewater flows, the BOD values may increase since an increased flow rinses the pipes. Measurement data can then give the impression that an unchanged population has increased if such data are not reported or assessed correctly.

In cases like those above, the European Commission requests explanations and requires new reporting that in turn stresses new investigations to be carried out and new evidence to be produced. Everything is being done unnecessarily and only caused by the EU Commission's requests on data and application of an indistinct directive on incorrect grounds.

- **Simplify the rules and reduce bureaucracy through reduced detailed regulation.** The UWWTD is and should remain a minimum directive. The requirements of such should only add a base level to be nationally implemented in all member states. The more requirements being regulated, the more will be followed up and the more difficult it will be to implement the requirements in all member states without regulating exceptions and criteria for applying exceptions, which also must be followed up.

Requirements, and criteria for requirements, in EU directives are often applied literally. The EU- Commission therefore follows up and applies every detail requirement in a directive as formulated. Detailed requirements often must be provided with exceptions aiming at a reasonable and possible implementation everywhere in the EU, from Sicily and Cyprus in the Mediterranean to Malå and Rovaniemi in the subarctic counties Norrbotten in Sweden and the Finnish Lapland respectively. Each exception is in turn provided with conditions for when and how the exception may be applied.

When the EU Commission monitors the implementation of the directive, it asks for detailed information and evidence on the application of each detail requirement, every exception and on whether the conditions for the exceptions are met. Often more data or complementary information is required to follow up requirements, exceptions and conditions. Each detailed requirement thus entails a burst of reporting requirements, all of which must be followed up and answered by authorities, operators or treatment plants, of which there are tens of thousands in the EU. Only in Sweden with 10 million inhabitants there are >400 UWWTP designed for agglomeration with more than 2000 pe. They are situated in 290 municipalities in 21 counties. The total number of UWWTP is approximately 1 700. Approximately 500 million people live throughout the whole EU.

In addition, the Commission raises questions to be answered to understand every detailed that has been followed-up. The responses are then result in counterquestions or statements that must be answered with new evidence and data, which in turn must be obtained from each local operator, sometimes via all relevant authorities. The questions are often accompanied by questions on matters not regulated in the directive, e.g. with the aim to obtain data for statistics or from other reasons. One example is misbegotten and amateurish questions on finances that do not distinguish between new investments, reinvestments, capital costs, costs for operation and maintenance and total costs.

The questions are not often formulated to be easily answered. If the requested information or data are not needed locally there is no documentation of such data in place or is the requested data delimited differently due to local needs. In such situations the documentation must be redone before the question can be answered. Reporting requirements may recur every year or every two years, but sometimes the question is formulated differently, and the content is varied. This creates an endless bureaucracy, irritation, and unnecessary costs but very few added values. On top of this, the Commission will be at risk of making conclusions and writing reports on weak or erroneous evidence as a basis for European policy development.

In each step of the legislative process, the number of regulated details seems to increase - from expert groups, through the Commission via the Council of Ministers and Parliament. Given the role the Commission have, to control member state's implementation, it is only through a simpler regulatory framework with fewer details that bureaucracy and insignificant costs can be limited. Therefore, only the most functional and most important requirements should be regulated and in the simplest possible manner. Social benefits, efficiency and practicability when implementing the requirements to protect the environment must take precedence over bureaucracy, administration, and excessive control.

Other issues

• **Make emission requirements stricter only by specifying the figures more accurate.** A maximal emission level of 1,0 mg/L is a stricter requirement than a level of 1 mg/l and a concentration of 0,50 mg/L is a stricter requirement than 0,5 mg/L achieved only by an increase of the number of decimals. The treatment technology does not need to be changed by adjusting the decimals, but those who run the UWWTP need to tighten their internal control and improve maintenance routines of the technology in use to meet the stricter requirement. For phosphorus, it should be possible to specify the accuracy with two decimals figures if maximum levels of 0,50 mg/L or higher are regulated.

Since the actual emission level always varies, the average emission must have a margin to the regulated level. This explains why a requirement of 0,2 mg / l gives an emission of approximately 0,15 mg/L. It is difficult to regulate levels below 0,2 mg/L. The risks of violating even lower levels without purpose increase if the requirements are made tougher.

Unfortunately, the requirements in today's UWWD are formulated as integers without decimals (e.g. 2 mg/L), which means that samples with an average concentration of 2,49 mg/L can be rounded off to 2 mg/L and still meet the requirement, despite that the actual emission is 25% higher. Such an outdated high regulated emission level stated with such low accuracy, in combination with a low reduction requirement of 80% for phosphorus as an alternative requirement, makes the directive's environmental requirements much too weak and the emission figures unreliable. This is not reasonable, given the Baltic Sea crisis, the extent of eutrophication elsewhere in the EU and the technological developments made from 1991 until today. Just by tightening the requirement from 2 to 2,0 mg/L or from 1 to 1,0, the average emission would be 2,049 mg/L or 1.049 as maximums and could be rounded off to 2,0 mg/L and 1,0 respectively. Only such a simple adjustment will reduce the regulated emission margins by approximately 18% and 29%, respectively, and data on the actual emissions will be more reliable.

The conditions for emissions of nitrogen and phosphorus are sometimes specified with two valid figures in permits for Swedish UWWTP, even when the concentration requirements are 0,20 mg/L (phosphorus) or 10,0 mg/L (nitrogen). For example, the UWWTP of Henriksdal in Stockholm received a new permit with a requirement of 0,20 mg phosphorus/L.

For nitrogen and BOD, levels indicated as singulars should be maintained as UWWD-requirements, especially for BOD for which the uncertainty in the analysis is very high (+/- 30%).

• **Delete emission and control requirements on COD (chemical oxygen demand).**

The COD parameter is now longer functional as emission control. COD data reflects the demand of oxygen to decompose chemicals in the water. The analysis has a direct link to the energy content connected to pollutants.

The analysis shows the COD concentration in outlet, but the figure cannot be used for anything as the figure cannot be deduced to what or which substances in the wastewater are causing it. Consequently, you get no guidance on what action should be taken to mitigate COD. Since UWWTP are built to treat substances other than specifically COD-influencing ones, a measure may just as well be needed elsewhere than in the UWWTP, probably somewhere in the agglomeration.

COD control requires an analytical method (COD_{Cr}) contains mercury, a toxic substance. The analysis can be easily performed with ampoules that are returned to the supplier and then reused. The ampoule system is thus closed.

However, the COD analysis is very important to use in order to be able to design UWWTP and to make internally control possible and to optimize operations when other emission requirements becomes stricter. The analysis is also needed in technology research.

Energy and personnel are the single largest operational costs. International models for designing UWWTP and for international benchmarking require access to COD data. The analysis method is the only one available that provides a value being directly representative of the wastewater's content of energy, which is necessary to know in order to keep operating costs down. Such internal COD-data is also needed to make it possible to develop technology and UWWTPs into resource management facilities that can meet society's future needs for bioenergy, nutrients for agriculture, water that can be recycled for agriculture or other future needs etc.

COD analysis for internal control and technology development purposes should not be regulated in the UWWDD, but it is important to be aware of the significance of the analysis as such.

Annex 2

Extract from **The COUNCIL DECISION of 28 June 1999 laying down the procedures for the exercise of implementing powers conferred in the Commission (1999/468/EC)**

Article 5

The regulatory procedure

1. The Commission shall be assisted by a regulatory committee composed of the representatives of the Member States and chaired by the representative of the Commission.
2. The representative of the Commission shall submit to the committee a draft of the measures to be taken. The committee shall deliver its opinion on the draft within a time-limit which the chairman may lay down according to the urgency of the matter. The opinion shall be delivered by the majority laid down in Article 205(2) of the Treaty in the case of decisions which the Council is required to adopt on a proposal from the Commission. The votes of the representatives of the Member States within the Committee shall be weighted in the manner set out in that Article. The chairman shall not vote.
3. The Commission shall, without prejudice to Article 8, adopt the measures envisaged if they are in accordance with the opinion of the committee.
4. If the measures envisaged are not in accordance with the opinion of the committee, or if no opinion is delivered, the Commission shall, without delay, submit to the Council a proposal relating to the measures to be taken and shall inform the European Parliament.
5. If the European Parliament considers that a proposal submitted by the Commission pursuant to a basic instrument adopted in accordance with the procedure laid down in Article 251 of the Treaty exceeds the implementing powers provided for in that basic instrument, it shall inform the Council of its position.
6. The Council may, where appropriate in view of any such position, act by qualified majority on the proposal, within a period to be laid down in each basic instrument but which shall in no case exceed three months from the date of referral to the Council.

If within that period the Council has indicated by qualified majority that it opposes the proposal, the Commission shall re-examine it. It may submit an amended proposal to the Council, re-submit its proposal or present a legislative proposal on the basis of the Treaty.

If on the expiry of that period the Council has neither adopted the proposed implementing act nor indicated its opposition to the proposal for implementing measures, the proposed implementing act shall be adopted by the Commission.

Article 7

1. Each committee shall adopt its own rules of procedure on the proposal of its chairman, based on standard rules of procedure which shall be published in the *Official Journal of the European Communities*.

Insofar as necessary existing committees shall adapt their rules of procedure to the standard rules of procedure.

2. The principles and conditions on public access to documents applicable to the Commission shall apply to the committees.

3. The European Parliament shall be informed by the Commission of committee proceedings on a regular basis. To

that end, it shall receive agendas for committee meetings, draft measures submitted to the committees for the implementation of instruments adopted by the procedure provided for by Article 251 of the Treaty, and the results of voting and summary records of the meetings and lists of the authorities and organizations to which the persons designated by the Member States to represent them belong. The European Parliament shall also be kept informed whenever the Commission transmits to the Council measures or proposals for measures to be taken.

4. The Commission shall, within six months of the date on which this Decision takes effect, publish in the *Official Journal of the European Communities*, a list of all committees which assist the Commission in the exercise of implementing powers. This list shall specify, in relation to each committee, the basic instrument(s) under which the committee is established. From 2000 onwards, the Commission shall also publish an annual report on the working of committees.

5. The references of all documents sent to the European Parliament pursuant to paragraph 3 shall be made public in a register to be set up by the Commission in 2001.

Article 8

If the European Parliament indicates, in a Resolution setting out the grounds on which it is based, that draft implementing measures, the adoption of which is contemplated and which have been submitted to a committee pursuant to a basic instrument adopted under Article 251 of the Treaty, would exceed the implementing powers provided for in the basic instrument, the Commission shall re-examine the draft measures. Taking the Resolution into account and within the time-limits of the procedure under way, the Commission may submit new draft measures to the committee, continue with the procedure or submit a proposal to the European Parliament and the Council on the basis of the Treaty.

The Commission shall inform the European Parliament and the committee of the action which it intends to take on the Resolution of the European Parliament and of its reasons for doing so.

Annex 3

As the italicized text below from the present UWWTD shows, the Article 10 in this directive require Member States to construct and design and thus to adapt their UWWTP's capacity to the agglomerations to ensure compliance with the requirements in Article 7, which in turn refer to the definition of appropriate treatment in Article 2.9. The reference in the definition to quality objectives in other Community Directives includes objectives in the Water Framework Directive and the Marine Strategy Framework Directive.

Article 10 in the UWWTD

Member States *shall ensure that the urban waste water treatment plants built to comply with the requirements of Articles 4, 5, 6 and 7* are designed, constructed, operated and maintained to ensure sufficient performance under all normal local climatic conditions. When designing the plants, seasonal variations of the load shall be taken into account.

PROPOSAL FOR A SUPPLEMENTARY PARAGRAPH IN THE ARTICLE OR IN A SEPARATE ARTICLE:

A Member State will not be in breach with the EU-directive 2000/60/EC when they fail to prevent deterioration from of status of a body of surface water by discharging treated waste water from a waste water treatment plant, if the following conditions are met;

- the deterioration will be caused by an enlargement and improvement of an existing plant or by a new plant aimed to meet increased loads of pollutants from the agglomeration,
- best available technique is being used,
- more technical measures to reduce the flow of wastewater are not practically feasible to take,
- the substances causing deterioration cannot be stopped by disconnecting industries from the collecting system,
- no suitable alternative recipient is available to transfer the treated wastewater to without causing unreasonable costs or without unproportionally negative risks for private properties, drinking water sources, the environment or to public health.

PROPOSAL FOR AN EXTRA SUPPLEMENTARY PARAGRAPH, IF THE SCOPE OF THE UWWTD WILL BE EXTENDED TO STORM WATER OR URBAN RUN OFF

Neither will a Member state be in breach with that directive by establishing new or adapting existing specific facilities for management of storm water to safeguard the settlement or to treat storm water from pollutants.

Article 7 in the UWWTD

Member States shall ensure that, by 31 December 2005, *urban waste water* entering collecting systems *shall before discharge be subject to appropriate treatment as defined in Article 2 (9)* in the following cases:

- for discharges to freshwater and estuaries from agglomerations of less than 2 000 p.e.,
- for discharges to coastal waters from agglomerations of less than 10 000 p.e.

Article 2 in the UWWTD

9. 'appropriate treatment' *means treatment of urban waste water* 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 this *and other Community Directives*.