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Agenda item 6: Review of the new/upgraded Regional Plans in accordance with Article 15 of the LBS Protocol

Regional Plan for Urban Wastewater Treatment

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UNEP/MAP
Athens, 2021

Note by the Secretariat

The 21st Ordinary Meeting of the Contracting Parties (COP-21) to the Barcelona Convention and its Protocols (Naples, Italy, 2-5 December 2019) adopted Decision IG.24/10 which mandated UNEP/MAP (MED POL Programme) to upgrade the Regional Plan on the Reduction of Biochemical Oxygen Demand (BOD5) from Urban Wastewater thereafter titled the “Regional Plan on Urban Wastewater Treatment” (hereafter referred to as the “Regional Plan”).

To this aim, COP21 Decision IG.24/10 requested the establishment of a Working Group of Experts (WG) designated by the Contracting Parties to submit to the MED POL Focal Points Meeting the Regional Plan. The First Meeting of the Working Group was held on 9 and 10 December 2020. The Meeting reviewed and agreed on the draft Regional Plan on Urban Wastewater Treatment and recommended a number of changes.

The Meeting also agreed to allow the members of the WG to provide written inputs on the proposed deadlines for implementation of measures included in square brackets in the Regional Plan; technical details of the subject matter addressed in the Regional Plan including tabulated Emission Limit Values and related technical data and information; as well as scope and outline of contents of technical Appendices which were at the drafting stage.

Inputs and comments were received from five Contracting Parties: Bosnia and Herzegovina, Croatia, France, Italy and Malta. The following summarizes some of the key issues raised by these Countries. Details are provided within the text of the Regional Plan.

- *Bosnia and Herzegovina* noted that provisions in the Regional Plan related to the legally binding emission limit values (ELVs) will entail technical and financial implications which may not be feasible. A number of emission limit values proposed in this Regional Plan are often not in line with national ELVs; being higher, or lower or non-existent. In fact, as the Regional Plan applies to coastal water basins, there will be a need for separate regulations (coastal and internal basins). The date of 2023 for setting legal framework for emission limits is too short as this entails the need to amend nationally-set ELVs. The requirement for tertiary treatment attributed to agglomerations in excess of 15,000 will entail excessive costs to implement and may not be necessary if area is not classified as sensitive area.
- *Croatia* noted that the requirement for tertiary treatment attributed to agglomerations in excess of 15,000 will bring excessive cost to build and maintain such treatment plants adding the need to relate this requirement to sensitivity of the receiving waters with regard to the requested level of treatment. With regard to industrial wastewater, Croatia notes that ELVs should take into account ecological and chemical status of the recipient's waters and not only BAT/BEP.
- *France* welcomed the integration of the reuse of treated wastewater into the regional plan for wastewater treatment, and noted that the regional plan encourages the reuse of wastewater only for two uses: agricultural irrigation and groundwater recharge, while there are other uses that can be also included. France noted the need to coordinate requirements of the Regional Plan with EU regulations while highlighting that certain provisions related to level of wastewater treatment in this Regional Plan are more strict than the EU regulations, which would entail additional cost on the Contracting Parties. A number of modifications and amendments were submitted by France on measures under various Articles. These are reflected in the body of the text of the Regional Plan.
- *Italy*: raised the issue related to the use of the term “quality standard” vis-à-vis “ELVs” noting the need for uniformity of terms across the plan. Italy also noted that adopting standards is in 2023 while meeting these standards is set for 2035 adding that over such a long period of time, many technological advances would have occurred which would necessitate review of these

deadlines. Finally, Italy noted that ELVs for substances and parameter should be selected and regulated following a risk-based approach which takes into account regional and local conditions, indicating that the prescriptive approach for setting ELVs should be reconsidered.

- *Malta* indicated that the Regional Plan is setting much stricter monitoring and compliance requirements in relation to a wide range of parameters and extends these restrictions to include water re-use and discharge into sewers. Malta suggested that a flexible risk-based approach should be considered instead, which would ensure applicability of the plan across the region, noting that this approach is also currently under discussion as part of the revision processes of relevant policies at EU level.

The present document includes all proposals and inputs provided above. These are categorized as follows:

- Amendments made to the document and agreed by the first Working Group Meeting are highlighted in **green**, with reference to the paragraph in which the amendments were agreed.
- Segments discussed during the Meeting for which no agreement was reached remain in brackets in “**blue typeset**”.
- Proposals for amendments or inputs by the Contracting Parties for Articles in the Regional Plan are presented in text as “**blue typeset**” or as footnotes.
- “Clarifications” provided to respond to the requests of the Contracting Parties on the contents of the measures are provided in footnotes.

The Second Meeting of the Working Group is expected to review the above elements of the Regional Plan and recommend the final version to the MED POL Focal Points Meeting to be held back-to-back with this meeting (i.e. 27-28 May 2021).

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Regional Plan for Urban Wastewater Treatment

ARTICLE I Definition of Terms

For the purpose of this Regional Plan for Urban Wastewater Treatment; hereinafter referred to as the “Regional Plan”:

- a) "Agglomeration" means an area where the population and/or economic activities are sufficiently concentrated for urban wastewater to be collected and conducted to an urban wastewater treatment plant or to a final discharge point;
- b) "Appropriate treatment" means treatment of urban wastewater by any process and/or disposal system which after discharge allows the receiving waters to meet the relevant quality objectives;
- c) "Aquifer" is an underground rock formation or sedimentary deposit porous enough to hold water that can be used to supply wells;
- d) "Aquifer recharge" is the process of water infiltration by rainfall or other surface water into the ground. Groundwater recharge or deep percolation is a hydrologic process, whereby water moves downward from surface water to groundwater;
- e) "Best Available Techniques (BAT)" as defined in Annex IV for the Land-Based Source and Activities (LBS) Protocol;
- f) "Best Environmental Practice (BEP)" as defined in Annex IV for the Land-Based Source and Activities (LBS) Protocol;
- g) "Biochemical Oxygen Demand (BOD5)" Amount of oxygen needed for the biochemical oxidation of the organic matter to carbon dioxide in 5 days;
- h) "Collecting system" means a system of conduits which collects and conducts urban wastewater;
- i) “Contaminants of Emerging Concern (CEC)” include several types of chemicals: persistent organic pollutants (POPs), pharmaceuticals and personal care products (PPCPs), including a wide suite of human prescribed drugs, veterinary medicines such as antimicrobials, antibiotics, anti-fungal, [growth promoters and hormones; endocrine-disrupting chemicals (EDCs)], including synthetic estrogens and androgens, nanomaterials such as carbon nanotubes or nano-scale particulate titanium dioxide, of which little is known about either their environmental fate or effects;
- j) "Domestic wastewater" means wastewater from residential settlements and services which originates predominantly from the human metabolism and from household activities;
- k) "Emission Limit Value (ELV)" means the maximum allowable concentration measured as a “composite” sample, of a pollutant in an effluent discharged to the environment;
- l) "Industrial wastewater" means any wastewater which is discharged from premises used for carrying on any trade or industry, other than domestic wastewater and run-off rainwater ;
- m) "Managed aquifer recharge (MAR)" is defined as the intentional recharge of water to aquifers for subsequent recovery or environmental benefit;
- n) "One (1) population equivalent (p.e.)" means the organic biodegradable load having a five-day biochemical oxygen demand (BOD5) of 60 grams of oxygen per day. For the purpose of this regional plan, the load expressed in p.e. shall be calculated on the basis of the maximum average weekly load entering the treatment plant during the year, excluding unusual situations such as those due to heavy rain;

- o) "Primary treatment" means treatment of urban wastewater by a physical and/or chemical process involving settlement of suspended solids, or other processes in which the BOD5 of the incoming wastewater is reduced by at least 20 percent before discharge and the total suspended solids of the incoming wastewater are reduced by at least 50 percent;
- p) "Reclaimed water" urban wastewater that has been treated to meet specific water quality criteria with the intent of being used for a range of beneficial purposes. [~~Synonymous with recycled or reused water~~];
- q) "Secondary treatment" means treatment of urban wastewater by a process generally involving biological treatment with a secondary settlement or other process so that the treatment results in a minimum reduction of the initial load of 70 to 90 percent of BOD5;
- r) [~~"Tertiary treatment" means treatment of urban wastewater by process generally involving of physical, chemical, biological and other procedures so that the treatment results in reduction of nutrient salts by 80 percent and the initial load of more than 90 percent of BOD5~~];
- s) "Urban wastewater" means wastewater of the mixture of domestic wastewater with industrial wastewater and/or run-off rainwater (91/271/EEC);
- t) "WEFE" means Water – Energy – Food – Ecosystem Nexus;
- u) "Wastewater Treatment Plant (WWTP)" means systems used to treat urban wastewater using physical, chemical and/or biological techniques.

ARTICLE II

Scope and Objective

1. The area to which the Regional Plan applies is the area defined in accordance with Article 3 of the LBS Protocol, consisting of the Mediterranean Sea Area as defined in Article 1 of the Convention; the hydrologic basin of the Mediterranean Sea Area; waters on the landward side of the baselines from which the breadth of the territorial sea is measured and extending, in the case of watercourses, up to the freshwater limit; brackish waters, coastal salt waters including marshes and coastal lagoons; and ground waters communicating with the Mediterranean Sea.
2. The Regional Plan shall apply to the collection, treatment, reuse and discharge of urban wastewaters and the pre-treatment and discharge of industrial wastewater from certain industrial sectors.
3. The objective of the Regional Plan on Urban Wastewater Treatment is to protect the coastal and marine environment and human health from the adverse effects of the above mentioned wastewater direct and or indirect discharges, in particular regarding adverse effects on the oxygen content of the coastal and marine environment and eutrophication phenomena as well as promote resource water and energy efficiency.

ARTICLE III

Preservation of Rights

4. The provisions of this Regional Plan shall be without prejudice to stricter provisions respecting the management of urban wastewater treatment plants contained in other existing or future national, regional or international instruments or programs.

ARTICLE IV Guiding Principles

5. The Regional Plan measures are formulated to ensure the application of the following principles:
- i. Effective [reclamation and reuse] [~~reuse and reclamation~~] of treated wastewater is promoted as a means for water resource conservation and efficiency to effectively address regional water scarcity;
 - ii. Wastewater collection and treatment systems incorporate aspects related to climate change impacts in the design and operation phases, including extreme hydrological patterns and their impact on influent wastewater;
 - iii. Wastewater treatment processes promote energy efficiency and water savings, and integrate renewable energy alternatives to the extent possible in accordance with BAT and BEP;
 - iv. Industrial wastewater entering collection systems and WWTPs are subject to pre-treatment in order to (a) protect the collection systems and the treatment plant; (b) ensure that the operation of the WWTP and the treatment of the sludge are not impeded; and (c) ensure that discharge effluents do not adversely affect the Mediterranean marine environment, particularly for priority substances, contaminants of emerging concern which are harmful to the receiving waters and cannot be treated in urban WWTPs;
 - v. [For the purpose of this Regional Plan], WEFE nexus is incorporated into the design phase of WWTPs with the aim to promote energy efficiency, reuse of treated wastewater in agriculture, and recharge of groundwater aquifers with treated wastewater;
 - vi. Selection of treatment technologies takes into consideration investment and operational costs of the treatment technology and the ability to pay by beneficiaries in order to ensure sustainable and reliable quality-treated wastewater.

ARTICLE V Measures

I. Collection and treatment of urban wastewater

6. The Contracting Parties shall ensure that all agglomerations are provided with collecting systems for urban wastewater as follows:
- i. [At the latest by 2025] for those with a population equivalent (p.e.) of more than 15,000;
 - ii. [At the latest by 2035] for those with a population equivalent (p.e.) between 2000 and 15,000.
7. The Contracting Parties shall set [~~quality standards with the aim of meeting~~] emission limit values for discharge of treated effluents from WWTPs **upon implementation of necessary measures**. [To this aim, the Contracting Parties shall [set] [adopt] at the latest by 2023 the minimum emission limit values as provided for in Appendix I for the following categories]:
- i. Minimum [emission limit values] for discharge of effluents from urban wastewater treatment plants to the environment (Appendix I.A).
 - ii. Minimum [emission limit values] for reuse of treated wastewater for agriculture irrigation (Appendix I.B).¹

¹ In the original version of the Regional Plan, Appendix I.B 1 has a section addressing aquifer recharge. Since the focus in Appendix I.B is on ELVs, the section pertaining to Managed Aquifer Recharge is placed under Appendix II.

- iii. The [emission limit values] for discharge of industrial wastewater into collecting systems and urban wastewater treatment plants (Appendix I.C).
- 7.bis The Contracting Parties may approve stricter [emission limit values] than those provided in Appendix I considering the characteristics of receiving/recipient environment.
8. The Contracting Parties shall ensure that prior to discharge, treated wastewater from urban WWTPs meets the following requirements ~~[minimum performance reduction targets]~~ [by 2035 at the latest]:
 - i. All discharges from agglomerations attributed to a population size of more than 15,000 p.e. are subject to tertiary treatment.
 - ii. All discharges from agglomerations attributed to a population size between 2,000 and 15,000 p.e. are subject to secondary treatment
9. The Contracting Parties shall promote to the extent possible nature-based solutions for small agglomerations of less than 2000 p.e. with a focus on constructed wetlands where applicable ~~[based on the elements as provided for in Appendix II]~~.²
10. The Contracting Parties shall ensure that urban wastewater treatment plants, built to comply with the requirements of Articles 7 and 8, are designed, constructed, operated and maintained to ensure sufficient performance under normal local climatic conditions.
11. The Contracting Parties shall ensure that WWTPs are designed to account for:
 - i. Seasonal variations of loads including from touristic activities;
 - ii. Volume and characteristics of the local municipal wastewater; and
 - iii. Limitation of pollution of receiving water (taking into consideration, inter alia, Contaminants of Emerging Concern).
12. The Contracting Parties shall implement measures for:
 - i. Segregating collection systems for storm water and municipal wastewater, if technically and economically feasible;
 - ii. Preventing or if not possible minimizing sewage and wastewater treatment plants' overflow due to rainwater penetration and flooding;
 - iii. Addressing impacts of points of discharge of treated wastewater so as to minimize effects on receiving waters;
 - iv. Adopting tools for conservation of surface water runoff in built environment; and
 - v. Reducing pollutant loads and litter in storm water runoff from municipal and industrial sources.

II. [Reclamation and reuse] of wastewater

13. The Contracting Parties shall promote the reuse of treated wastewater. To this aim, the Contracting Parties shall:
 - i. Ensure that treatment technologies and additional treatments for reclaimed water meet the minimum [emission limit values] for water reuse as provided for in Appendix I.B.]
 - ii. [Implement water reuse systems that include:
 - a) Storage and distribution systems for reuse of treated effluents in agriculture;

² In the views of the Secretariat, Appendix II on "Overview of Nature-Based Solutions for Small Agglomerations" should be deleted and included in common technical guidelines to facilitate the implementation of this Regional Plan.

- b) Recharge methods in case of managed aquifer recharge [strictly complying with Appendix II Guiding Principles].³

III. Industrial wastewater discharge

14. [By 2023 at the latest,] the Contracting Parties shall ensure that the competent authority or appropriate body sets emission limit values appropriate to the nature of industry discharging industrial effluents to collection systems connected to urban WWTPs [as provided for in Appendix III].⁴
15. [By 2025/2035 at the latest,] the Contracting Parties shall ensure that industrial wastewater discharged into collecting systems and urban WWTPs shall meet emission limit values set in Appendix I.C.
16. ~~[By 2025/2035 at the latest,] the Contracting Parties shall ensure that industrial wastewater discharged to the environment shall meet emission limit values [achieved through implementation of pretreatment according to BAT and BEP with respect to conditions specified in prior regulations and/or specific authorization by the competent authority or appropriate body].~~⁵

IV. Monitoring

17. The Contracting Parties shall take measures [to ensure regular monitoring in accordance with general elements and monitoring frequencies requirements as provided in Appendix III of the Regional Plan]:⁶
- i. Discharges from urban wastewater treatment plants to verify compliance with the requirements ~~[in accordance with the monitoring control procedures laid down in Appendix V.A].~~⁷
 - ii. Receiving waters subject to discharges from urban wastewater treatment plants.
 - iii. Quality of reclaimed wastewater discharged from treatment plants for beneficial use ~~[in line with the main elements of monitoring programmes provided for in Appendix V.B].~~⁸
 - iv. Discharged industrial effluents to collection systems including substances harmful to receiving waters, sewerage networks and urban wastewater treatment plants ~~[in accordance with the appropriate monitoring programmes set forth in Appendix V.C].~~⁹

³ Minor editorial changes have been introduced by the Secretariat for this article with the exception of the last sentence which appears in blue and square brackets for the consideration of the Meeting.

⁴ In the views of the Secretariat, Appendix III on “Industrial sectors for which emission limit values must be set prior to discharge into collecting systems and urban WWTPs” should be deleted and included in common technical guidelines to facilitate the implementation of this Regional Plan

⁵ In the views of the Secretariat, it may be redundant to maintain this provision since it is already addressed in provision 7.i of this regional plan.

⁶ Proposal by the Secretariat

⁷ In the views of the Secretariat, Appendix V.A on “Monitoring control procedures for discharges from urban wastewater treatment plants” should be deleted and included in common technical guidelines to facilitate the implementation of this Regional Plan.

⁸ In the views of the Secretariat, Appendix V.B on “Monitoring programmes of treated wastewater further to water class for reuse in agriculture” should be deleted and included in common technical guidelines to facilitate the implementation of this Regional Plan.

⁹ In the views of the Secretariat, Appendix V.C on “Monitoring program of discharged industrial effluents to collecting systems” should be deleted and included in common technical guidelines to facilitate the implementation of this Regional Plan.

ARTICLE VI
Technical Assistance, Transfer of Technology and Capacity Building¹⁰

18. For the purpose of facilitating the effective implementation of Article V of this Regional Plan, the Contracting Parties collaborate to implement, exchange and share best practices directly or with the support of the Secretariat including BAT, BEP, ¹¹ sustainable consumption and production, **circular economy**, resource efficiency, WEF Nexus in the design, construction, operation and maintenance of the urban wastewater treatment plants. [To this aim, the Contracting Parties also collaborate in preparing and implementing common technical guidelines].

ARTICLE VII
Timetable for Implementation

19. The Contracting Parties shall implement the measures included in this Regional Plan as per the timelines associated with these measures.

ARTICLE VIII
Reporting

20. The Contracting Parties shall report on implementation of measures stipulated in this Regional Plan in line with the reporting requirement and timelines provided in Article 26 of the Convention and Article 13, paragraph 2(d) of the LBS Protocol.

ARTICLE IX
Entry into Force

21. The present Regional Plan shall enter into force and become binding on the 180th day following the day of notification by the Secretariat in accordance with Article 15, paragraphs 3 and 4, of the LBS Protocol.

¹⁰ Minor editorial changes have been introduced by the Secretariat for this article with the exception of the last sentence which appears in blue and square brackets for the consideration of the Meeting.

¹¹ In the views of the Secretariat, Appendix IV on “Recommended BAT and BEP for pollution prevention, reduction and control in urban wastewater treatment plants” should be deleted and included in common technical guidelines to facilitate the implementation of this Regional Plan.

[APPENDIX I.A

Emission Limit Values for discharge of effluents from urban wastewater treatment plants to the environment

Table 1: Emission limit values for discharge of effluent to the environment

Element	Unit	Emission limit values
Total phosphorus	%	Minimum percentage of reduction of overall load entering WWTP is at least 75%
Total nitrogen	%	
Total phosphorous	mg/L	2
Total Nitrogen	mg/L	15 to 40
Arsenic (As)	mg/L	0.05-0.01 to 0.5
Cadmium (Cd)	mg/L	0.025
Chlorine residual	mg/L	0.1
Chromium (Cr)	mg/L	0.25
COD	mg/L	100
Copper (Cu)	mg/L	0.1
Cyanide	mg/L	0.01
Lead (Pb)	mg/L	0.04
Mercury (Hg)	mg/L	0.0025
Mineral Oil	mg/L	1.5
Nickel	mg/L	0.25
pH	pH unit	7-8.5
Phenol	mg/L	0.025 to 0.15
Total Suspended Solids (TSS)	mg/L	15 to 30
Zinc	mg/L	1
Total Hydrocarbons	g/L	2 – 10

Emission limit values (ELVs) for other emerging pollutants may be set considering the following factors:

- Setting thresholds for toxicity of effluent streams discharged to the environment to prevent toxicity to aquatic organisms
- Determination of the minimum percentage of biodegradability of the effluent streams (at least 80%) to achieve minimum accumulation in the ecosystem and losses of habitats and biodiversity; and
- Identification of potential microplastic sources and adoption of related policy and methodology further to state of the art on related research on this topic.].

APPENDIX I.B

Minimum emission limit values for reuse of treated wastewater for agriculture irrigation [~~or aquifer recharge~~]

Classes definitions for reclaimed water for reuse in agriculture irrigation:

Class A – All food crops, including crops eaten raw when reclaimed water comes into direct contact with edible parts of the crop, and irrigation of root crops.

Class B - Processed food crops: crops which are intended for human consumption not to be eaten raw but after a treatment process and **Non-food crops**: crops which are not intended for human consumption.

Table 2: Emission limit values for reclaimed water use in agricultural irrigation according to Class definition

Parameter	Limit values for reclaimed water quality class for effluent reuse in agricultural irrigation *	
	Class A	Class B
BOD5	≤10 mg/L	25 mg/L or reduction of the influent load of 70% to 90%.
COD **	100 mg/L	125 mg/L
E. Coli	≤10 cfu/100 ml	≤100 cfu/100 ml
Fecal Coli	≤10 cfu/100ml or below detection limit	≤100 cfu/100ml
Intestinal nematodes (helminth eggs)	≤1 egg/l	≤1 egg/l
Legionella spp.	≤1,000 cfu/l	≤1,000 cfu/l
Total Suspended Solids (TSS)	≤10 mg/L	35 mg/L or reduction of influent load of 90%.
Turbidity	≤5 NTU	None
Parameters applicable to both Classes (A and B)		
Total Nitrogen	25	
Total phosphorous	5	
Sodium - Na	150	
Chlorides - Cl	250	
Boron - B	0.5	
Heavy metals		
Cadmium - Cd	0.01	
Chromium - Cr	0.1	
Copper - Cu	0.2	
Mercury - Hg	0.002	
Nickel - Ni	0.2	
Lead - Pb	0.1	
Zinc - Zn	0.5	
pH	6.5-8.5	
Additional heavy metals		
Aluminium - Al	1 to 5	
Arsenic - As	0.1	

Parameter	Limit values for reclaimed water quality class for effluent reuse in agricultural irrigation *	
	Class A	Class B
Beryllium - Be	0.1	
Cobalt - Co	0.05	
Iron - Fe	2	
Lithium - Li	2.5	
Manganese - Mn	0.2	
Molibdenum - Mo	0.01	
Selenium - Se	0.02	
Vanadium - V	0.1	

* The provisions presented should only be adopted taking into account local conditions, and provided that total loads do not affect the receiving environment

[Table 3: Considerations for application of appropriate class of reclaimed water, agricultural crop use and applicable irrigation method¹²

Crop	Reclaimed water quality class	Irrigation method
All food crops including root crops consumed raw	Class A	All irrigation methods allowed
Processed food crops	Class B	Drip irrigation only
Non-food crops including crops to feed milk/meat producing animals	Class A Class B	All irrigation methods allowed Drip irrigation only
Industrial, energy and seed crops	Class B	All irrigation methods are allowed]

¹² In the views of the Secretariat, this table may be removed from this Appendix and included either in a technical guideline document or in the regional plan on agriculture

APPENDIX I.C

Emission limit values for discharge of industrial wastewater into collecting systems and urban wastewater treatment plants

Industrial wastewater entering collection systems and urban wastewater treatment plants shall be subject to pre-treatment as required in order to:

- Protect the health of staff working in collecting systems and treatment plants.
- Ensure that collecting systems, WWTP and associated equipment are not damaged.
- Ensure that the operation of the WWTP and the treatment of sludge are not impeded.
- Ensure that discharges from the treatment plants do not adversely affect the environment or prevent receiving water from complying with other regulatory requirements.
- Ensure that sludge can be disposed of safely in an environmentally acceptable manner.

Table 4: Maximum emission limit values (ELV) for industries to discharge their effluents to collecting systems and urban WWTPs which will not damage wastewater treatment processes

Element	Unit	Limit values for effluent discharge
Aluminium - Al	mg/L	25
BOD5	mg/L	COD concentration not to exceed four times BOD concentration
Fluoride – F	mg/L	6
Sodium - Na	mg/L	230
Phenols	mg/L	3
Total O&G	mg/L	250
Arsenic - As	mg/L	0.1
Benzene	mg/L	0.05
Beryllium - Be	mg/L	0.5
Cadmium - Cd	mg/L	0.1
Chloride - Cl	mg/L	430
Chlorine	mg/L	0.5
Chromium - Cr	mg/L	0.5
Cobalt - Co	mg/L	1
COD	mg/L	2000
Copper - Cu	mg/L	0.5 to 1
Cyanide	mg/L	0.2 to 0.5
AOX	mg/L	1
Lead - Pb	mg/L	0.5
Lithium - Li	mg/L	0.3
Manganese - Mn	mg/L	1
Mercury - Hg	mg/L	0.05
Mineral Oil	mg/L	20
Molybdenum - Mo	mg/L	0.15
Nickel - Ni	mg/L	0.5
Total phosphorous - (TP)	mg/L	30
pH	units	6.0-10.0
Polyphenols	mg/L	100
Selenium - Se	mg/L	0.05
Total Dissolved Solids (TDS)	mg/L	3,500
Temp - C°	°	40° Celsius
Tin - Sn	mg/L	2
Total Nitrogen - (TN)*	mg/L	15-30
Total Hydrocarbons	mg/L	20
Toxicity to fish eggs (Tegg)		2
Total Suspended Solids (TSS)	mg/L	1000
Vanadium - V	mg/L	0.5

Element	Unit	Limit values for effluent discharge
Volatile halogenated hydrocarbons (VHHC)	mg/L	0.1**
Zinc - Zn	mg/L	3

* Total nitrogen as the sum of ammonia nitrogen, nitrite nitrogen and nitrate nitrogen

** Volatile halogenated hydrocarbons - sum of trichloroethene, tetrachloroethene, 1,1,1-trichloroethane, dichloromethane - calculated as chlorine

[Table 5: Potential parameters for monitoring in industrial wastewater at the point of discharge to collecting systems and urban WWTPs

No.	Industrial Activity	Parameters for monitoring
1	Wastewater containing mineral oil*	pH, TSS, VSS, Mineral Oil, Total Oil & Grease, Heavy Metals, Total Hydrocarbons, Polyphenols, Phenols
2	Domestic and communal wastewater (function halls, restaurants, shopping malls, Hotels etc.);	BOD, COD, pH, TSS, Total Oil & Grease, Cl, Na, Boron, Detergents***
3	Food Sector - Animal and vegetable products**	COD, pH, TSS, Total Oil & Grease, Heavy Metals, Cl, Na, Total N, Total P, Polyphenols, Phenols
4	Food Sector - Meat industry & Fish processing	BOD, COD, pH, TSS, Total Oil & Grease, Cl, Na, Total N, Total P, Polyphenols, Phenols
5	Textile sector - manufacturing and finishing	BOD, COD, pH, VSS, TSS, Cl, DOX, Heavy Metals, Toxicity to fish eggs (Tegg), Total Hydrocarbons, Detergents***
6	Metals production and processing	COD, pH, VSS, TSS, Mineral Oil, Heavy Metals, Cl, DOX, Cyanides, Total Hydrocarbons, Volatile halogenated hydrocarbons, Toxicity to fish eggs (Tegg)
7	Laundry Facilities	COD, pH, VSS, TSS, Cl, Na, Boron, Total Hydrocarbons, Detergents***
8	Gas stations	COD, pH, Mineral Oil, BTEX, MTBE
9	Agriculture: chicken farms, pig farms, fish farms, etc.	COD, pH, TSS, Cl, Na, Total N, Total N, Boron
10	Leather production, fur processing, leather fibreboard manufacturing	COD, VSS, TSS, Heavy Metals, Volatile halogenated hydrocarbons, Polyphenols, Phenols, Toxicity to fish eggs (Tegg)
11	Waste and wastewater management	BOD, COD, pH, VSS, TSS, Mineral Oil, Total oil & Grease, Heavy Metals, Total N, Total P, Cl, BOD, Total Hydrocarbons, Toxicity to fish eggs (Tegg)
12	Production of printing blocks, publications and graphic-arts products	pH, VSS, TSS, Heavy Metals, Cl, Toxicity to fish eggs (Tegg)
13	Chemical industry: chemicals, pharmaceuticals, fertilizers, pesticides, detergents, solvents, petrochemicals, Cosmetic, plastic etc.	BOD, COD, pH, VSS, TSS, Mineral Oil, Heavy Metals, Cl, DOX, Total N, Total P, Benzene, Phenols, Volatile halogenated hydrocarbons, Boron, Toxicity to fish eggs (Tegg)
14	Hospitals	BOD, COD, pH, VSS, TSS, Heavy Metals, Cl, Detergent***

* Wastewater containing mineral oil - facilities in which wastewater containing mineral oil is produced regularly in degreasing, cleaning, maintenance, repair and recycling disassembly of vehicles and vehicle parts.

** Food Sector - Animal and vegetable products - Milk processing, Production of fruit and vegetable products, Production of soft drinks and bottling of drinks etc.

*** Detergents - Surfactants in detergents shall be considered as biodegradable if the level of biodegradability (mineralisation) measured is at least 60% within twenty-eight days.

Additional requirements:

- *Determine reduction targets for industries using the following substances or their compounds: Hexachlorocyclohexane, DDT, Dicofol, Pentachlorophenol, endosulphane, aldrin, dieldrin, endrin, isodrin, Tetrachloromethane, Hexachlorobenzene, Hexachlorobutadiene, Trichloromethane, Trichloroethane, Tetrachloroethylene, 1,2 dichloroethane, Trichlorobenzene.*
- *Set requirements and reduction targets for industries in which the plants or operating units use Contaminants of Emerging Concern (CEC).*
- *Set thresholds for toxicity of effluent streams discharging to collection system and urban WWTPs.*
- *Determine minimum percentage of biodegradability of the effluent streams (at least 80%).*
- *Identify potential sources of microplastics; monitor the contents of the microplastic in the effluent streams; and adopt appropriate reduction targets.]¹³*

¹³ In the views of the Secretariat, Table (5) and related information could be included in the technical guidelines for the implementation of Article V of the Regional plan addressing measures and monitoring requirements

APPENDIX II

[Guiding principles on reuse of treated wastewater for aquifer recharge]

Managed aquifer recharge (MAR) is defined as the intentional recharge of water to aquifers for subsequent recovery or environmental benefit. The purposes for undertaking managed aquifer recharge are as follows:

- Establish saltwater intrusion barriers in coastal aquifers.
- Provide storage for the recharged water for subsequent retrieval and reuse.
- Maintain groundwater dependent terrestrial and aquatic ecosystems.
- Dilute saline or polluted aquifers.
- Control or prevent ground subsidence.

Recharge methods:

1. **Surface spreading** – a method of recharge whereby the water moves from the land surface to the aquifer by infiltration and percolation through the vadose zone. When used as a recharge method, adverse effects to the soil and related dependent ecosystems should be avoided.
2. **Direct injection** – a method of directly pumping/ injecting water into the groundwater zone. Direct discharges of pollutants into groundwater is not allowed.

Risk assessment:

Health and environmental risk assessment is needed to define minimum quality requirements. The assessment will address appropriate health protection; provision of public confidence in reuse practices; avoiding adverse effects on groundwater, soils and related dependent ecosystems. The overall levels of health protection should be comparable for different water-related exposures (i.e. drinking water, and reclaimed water for irrigation of food crops).

[APPENDIX III

Monitoring frequencies of pollutants discharged directly to the environment; or destined for reuse in agriculture; or discharged from industrial facilities to collecting systems

Monitoring the treated effluents discharge from urban WWTPs is used to determine compliance with emission limit values for discharge to the environment; to reuse in agriculture irrigation; or for aquifer recharge (Annex I.A, Annex I.B, Annex I.C).

Monitoring frequencies need to be sufficient to characterize the effluent quality and to detect events of noncompliance, considering the need for data and, as appropriate, the potential cost. Monitoring frequency should be determined on a case-by-case basis, consider the variability of the concentration of various parameters. A highly variable discharge should require more frequent monitoring than a discharge that is relatively consistent over time (particularly in terms of flow and pollutant concentration).

Frequency requirements may be reduced based on a demonstration of excellent performance. Facilities can demonstrate good performance by meeting a set of compliance and enforcement criteria and demonstrating their ability to discharge pollutants below the necessary levels consistently.

A minimum sampling frequency for the discharge effluents should be introduced in accordance with the guidance tables below.

Table 6: Recommended sampling frequency for treated effluents at the point of discharge.

Parameter	Monitoring Frequency		Grab / Composite sample
	Large UWWTP (more than 5,000 p.e.)	Small UWWTP (less than 5,000 p.e.)	
Heavy metals	Once a quarter	Once a year	Composite sample
EC + pH	continuous monitoring	Once a month	Grab samples
BOD, COD	Once a week	Once a month	Composite sample
Turbidity	Once a week	Once a month	Grab samples
TSS	Every two weeks	Once a month	Composite sample
Nutrients (N, P, K)	Once a week	Once a month	Composite sample
Pathogens	Every two weeks	Once a month	Grab samples
Mineral Oil, Phenol, Total Hydrocarbons	Once a month	Once a month	Grab samples

Table 7: Minimum frequency for reclaimed water monitoring for agricultural irrigation.

Parameter	Monitoring Frequency for Reclaimed water quality classes	
	Class A	Class B
BOD	once a week	Once a month
TSS	once a week	Once a month
Turbidity	continuous	Once a month
E.coli	once a week	twice a month
Legionella spp. (when applicable)	once a week	once a week
Intestinal nematodes (when applicable)	twice a month or frequency determined according to the number of eggs in wastewater	
Heavy metals	Once a quarter	Once a year
EC + pH	continuous monitoring	Once a month
Nutrients (N, P, K)	Once a week	Once a month

Table 8: Recommended sampling frequency per year for industrial wastewater at the point of discharge to the collection systems and urban WWTP

No.	Industrial Activities	Sampling frequency/year
1	Wastewater containing mineral oil	4
2	Domestic and communal wastewater (function halls, restaurants, shopping malls, hotels etc.)	4
3	Food Sector - Animal and vegetable products	4
4	Food Sector - Meat industry & Fish processing	4
5	Textile sector - manufacturing and finishing	4
6	Metals production and processing	6
7	Laundry Facilities	4
8	Gas stations	4
9	Agriculture: chicken farms, pig farms, fish farms, etc.	4
10	Leather production, fur processing, leather fibreboard manufacturing	4
11	Waste and wastewater management	Waste – 4 Hazardous waste - 6
12	Production of printing blocks, publications and graphic-arts products	4
13	Chemical industry including chemicals, pharmaceuticals, fertilizers, pesticides, detergents, solvents, petrochemicals, Cosmetic, plastic etc.	Water consumption: - less than 5,000 m ² /year - 6 - higher than 5,000 m ² /year - 12
14	Hospitals	4]