

## **Pesticide residues in water as ruled by EU legislation**

### **Briefing no.7**

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*Despite rather inadequate monitoring in most Member States (MS), pollution of the aquatic environment by pesticides seems to be on the rise. To better identify policy gaps, incoherencies or failures in policy implementation, we need a clear understanding of rules and controls related to pesticides, as ruled by the drinking water Directive, the authorisation of Plant Protection Products (PPPs) and Biocides Directives, the Water Framework Directive and associated Directives not yet repealed or in the process of elaboration as well as by the groundwater Directive (present and future).*

*Identifying policy gaps and incoherencies is essential for effective NGO advocacy for a high level of water protection from pesticides and, consequently, a high level of environmental and health protection. Seeing where implementation is failing is also crucial for NGOs to raise public awareness and play our traditional role as watchdog of policy implementation. This briefing describes the relevant sections and controls in these five directives and includes our critical comments (in italics) after each policy measure.*

## **1. THE DRINKING WATER DIRECTIVE**

### **1.1. Quality standards for pesticides**

Annex I of Council Directive 98/83/EC of 3 November 1998<sup>1</sup> on the quality of water intended for human consumption prescribes quality standards for pesticides in drinking water<sup>2</sup>.

The maximum permitted concentration is 0.1 microgram per litre ( $\mu\text{g/l}$ , equivalent to parts per billion) for each individual pesticide<sup>3</sup> (PPP or biocide) and their “relevant” metabolites, degradation and reaction products.

*The value of 0.1  $\mu\text{g/l}$  fixed for the first time in the previous drinking water Directive 80/778/EEC corresponded to the analytical zero at that time. This choice indicated the political will of the legislator to have no pesticides in drinking water, as a precautionary measure. The EU has decided to maintain the 0.1  $\mu\text{g/l}$  norm in Directive 98/83/EC. In doing so, the EU decision makers respected the Opinion of the Scientific Committee for Toxicity and Ecotoxicity which recommended maintaining the precautionary norm due to shortage of information on long term combination effects of pesticides. However, we can question the actual adequacy of this 0.1  $\mu\text{g/l}$  norm as (i) new toxicology findings better document potential low dose and/or long term effects of pesticides particularly for children and the unborn, (ii) there has been since 1992 a clear trend in arable farming towards active ingredients which are effective at lower dosage rates (grams instead of kilograms) than former standard products but which might correspondingly exert unwanted effects at doses lower than 0.1  $\mu\text{g/l}$ .*

The sum of all pesticides detected and quantified in the monitoring procedure “Pesticides – Total” cannot exceed the concentration of 0.5 $\mu\text{g/l}$ . *This sum parameter is very valuable as it allows limit potential combination effects of pesticides. Nevertheless, its pertinence can also be questioned for the above mentioned reasons.*

### **1.2. Controls and analytical detection limit**

“Only those pesticides which are likely to be present in a given supply need to be monitored”. *This prescription however leaves room for contestable choice related to pesticides to look for; new low dose*

*pesticides, most of time, remain unchecked as more difficult and expensive to analyse.* The frequency of controls for MS varies between 1 and 10 or more times a year depending on the volume of water distributed or produced each day within a supply zone.

Annex III of the drinking water Directive prescribes that the detection limit for individual pesticides has to be 0.025µg/l (25% of the values of 0.1µg/l) but admits that “this limit may not be achievable for all pesticides at present” and invites MS to “strive to achieve this standard”.

## **2. THE AUTHORIZATION OF PPPs DIRECTIVE**

Prescriptions related to maximum allowed concentration of pesticides in water are given in annex VI of Council Directive of 5 July 1991 concerning the placing of Plant Protection Products (PPPs) on the market 91/414/EEC<sup>4</sup>. Annex VI describes the Uniform Principles MS have to follow for the evaluation and authorization of PPPs.

### **2.1. Evaluation**

According to annex VI, MS are requested to evaluate the possibility of the plant protection product reaching the groundwater or surface water under the proposed conditions of use. If this possibility exists, they shall estimate, using a suitable calculation model validated at Community level, the concentration of the active substance and of relevant metabolites<sup>5</sup>, degradation and reaction products that could be expected in water. As long as there is no validated Community calculation model, MS shall base their evaluation especially on the results of mobility and persistence in soil studies and on the information on run-off and drift as provided for in Annexes II and III of Directive 91/414/EEC. This information will include for surface and for groundwater, - “where relevant” - other authorized uses of plant protection products in the area of envisaged use containing the same active substance or which give rise to the same residues, and, for groundwater, monitoring data on the presence or absence of the active substance and relevant metabolites, degradation or reaction products in groundwater as a result of previous use of plant protection products containing the same active substance or which give rise to the same residues.

### **2.2. Authorization conditions**

#### **2.2.1. Groundwater**

No authorization shall be granted if the concentration of the active substance or of relevant metabolites, degradation or reaction products in groundwater, may be expected to exceed, as a result of use of the PPP under the proposed conditions of use<sup>6</sup>, the lower of the following limit values:

- (i) the maximum permissible concentration laid down by Council Directive 80/778/EEC relating to the quality of water intended for human consumption: 0.1µg/l, or,
- (ii) the maximum concentration laid down by the Commission when including the active substance in Annex I, on the basis of appropriate data, in particular toxicological data, or, where that concentration has not been laid down, the concentration corresponding to one tenth of the Average Daily Intake (ADI) laid down when the active substance was included in Annex I unless it is scientifically demonstrated that under relevant field conditions the lower concentration is not exceeded.

*But the practice shows that values lower than 0.1 µg/l are only very exceptionally determined when including the active substance in Annex I. No sum parameter for the total concentration of pesticides is here considered.*

#### **2.2.2. Surface water**

No authorization shall be granted if the concentration of the active substance or of relevant metabolites, breakdown or reaction products to be expected after use of the plant protection product under the proposed conditions of use in surface water:

- (i) exceeds, where the surface water in or from the area of envisaged use is intended for the abstraction of drinking water, the limit values fixed by Council Directive 75/440/EEC<sup>7</sup> (between 1 and 5µg/l depending on the water treatment for the total concentration of parathion, dieldrin and hexachlorocyclohexane), or
- (ii) has an impact deemed unacceptable on non-target species, including animals:

- toxicity /exposure ratio for Fish and Daphnia is less than 100 for acute exposure and less than 10 for long term exposure, or
- the algal growth inhibition /exposure ratio is less than 10, or
- the maximum Bio Concentration Factor (BCF) is greater than 1,000 for PPP containing active substances which are readily biodegradable, or greater than 100 for those which are not readily biodegradable.

Unless it is clearly established that under field conditions no unacceptable impact on the viability of exposed species occurs – directly or indirectly – after the use of the PPP.

### **2.2.3. Analytical methods for the determination of residues**

Analytical methods must be able to determine and confirm residues of toxicological, ecotoxicological or environmental significance. In principle, methods proposed should be multi-residues methods but other methods are accepted. The limit of determination of the methods should be the lowest concentration tested at which an acceptable mean recovery rate is obtained (between 70% and 110% with a relative standard deviation equal or below 20%). But, if these criteria are not fully satisfied because of limitations in current analytical science and technology, authorization shall be granted for a limited period if the methods submitted prove adequate for the purpose intended. For monitoring purposes and according to annex II and III of Directive 91/414/EEC, the proposed limit of determination must not exceed 0.1µg/l for drinking water<sup>8</sup>. For surface water, the proposed limit of determination must not exceed a concentration which has an impact on non-target organisms deemed unacceptable. *These considerations however do not provide a clear idea of the limit of detection used for post registration pesticide monitoring in water and of their adequacy.*

## **3. THE BIOCIDES DIRECTIVE**

Prescriptions related to maximal allowed concentration of pesticides in water are given in annex VI of Council Directive 98/8/EC of 16 February 1998 concerning the placing of biocidal products on the market<sup>9</sup>. This annex VI describes the Common Principles MS have to follow for the evaluation and decision-making related to biocidal products.

### **3.1. Authorization conditions**

#### **3.1.1. Groundwater**

MS shall not authorise a biocidal product if, under the proposed conditions of use<sup>10</sup>, the foreseeable concentration of the active substance or of any other substance of concern or of relevant metabolites or breakdown or reaction products in groundwater exceeds the lower of the following concentrations:

- those fixed in the drinking water Directive: 0.1µg/l, or
- the maximum concentration as laid down following the procedure for including the active substance in Annex I, IA or IB to this Directive, on the basis of appropriate data, in particular toxicological data

unless it is scientifically demonstrated that under relevant field conditions the lower concentration is not exceeded.

#### **3.1.2. Surface water**

MS shall not authorise a biocidal product if the foreseeable concentration of the active substance or a substance of concern or of relevant metabolites, breakdown or reaction products to be expected in surface water or its sediments after use of the biocidal product under the proposed conditions of use:

- exceeds, where the surface water is intended for the abstraction of drinking water, the values fixed by:
  - Council Directive 75/440/EEC<sup>11</sup> (between 1 and 5µg/l depending on the water treatment for the total concentration of parathion, dieldrin and hexachlorocyclohexane),
  - the drinking water Directive (0.1µg/l) or
- has an impact deemed unacceptable on non-target species<sup>12</sup>, unless it is scientifically demonstrated that under relevant field conditions this concentration is not exceeded.

*We see here that an active substance or other residues of a biocide must not exceed, where surface water is intended for the abstraction of drinking water, the concentration of 0.1µg/l. This should also be requested for an active substance of a PPP, in order to lower the amount of water treatment needed and to be in coherence with the Water Framework Directive, article 7 (see below). Moreover, one can*

*appreciate the difference between the criteria for the determination of unacceptable effects for aquatic organisms between the PPP authorization Directive and the Biocides Directive.*

### **3.1.3. Analytical methods for the determination of residues**

They must allow the active substance and its residues to be estimated with adequate reliability at the maximal admissible concentration of 0.1 µg/l specified in the drinking water Directive.

## **4. THE WATER FRAMEWORK DIRECTIVE**

### **4.1. Introduction**

The Water Framework Directive<sup>13,14</sup> (WFD) provides an umbrella for all relevant water policies, repeals a number of Directives, including the Freshwater, Shellfish Water, Groundwater and Dangerous Substances Directives by 2013<sup>15</sup> and provides a wide range of management tools, including public involvement, long term and integrative planning.

The overall objective of the WFD is to achieve a “good status” for all waters by December 2015.

For surface waters, “good status” comprises a “good ecological” and a “good chemical” status. The “good ecological” status is described, in a normative way, as a “slight deviation” from the aquatic biodiversity found or estimated to exist under conditions where there has been only very minor human impact. But the problem lies here in finding reference values for the various ecological types of rivers, lakes and coastal waters and could result in the determination of very different standards across Europe. The “good chemical” status is determined by:

- (i) existing EU surface water quality standards (for pesticides ruled mainly by PPP and Biocides authorization Directives),
- (ii) still to be developed new EU legislations setting standards for EU relevant pollutants (“priority substances” comprising pesticides) and
- (iii) national standards for national or regional relevant pollutants (which might include pesticides), following a prescribed methodology.

The risks stemming from chemical pollution not covered by traditional monitoring (because of its complexity and combinations effects) should, in theory, now be detected through the required ecological assessment. As soon as the biological system, in a given water body, reacts negatively on chemical contamination, the causes should be identified and controlled in order to achieve “good ecological” status. *Of course, identification of individual causal factors will be very difficult in a context of joint exposure of aquatic organisms to a cocktail of chemicals and to substances having low dose / long term effects.*

For groundwater, “good status” is determined by a good “quantitative” and a “good chemical” status. “Good chemical” status is achieved when existing quality standards are met (e.g. for pesticides), and when the chemical contamination has no significant negative impact on surface waters or dependent terrestrial ecosystems and allows safe drinking water supply.

Article 17 of the WFD stipulates that the European Parliament (EP) and the Council shall adopt specific measures to prevent and control groundwater pollution. These measures, aimed at achieving good groundwater chemical status, shall include criteria for assessing such a status as well as criteria for the identification of significant and sustained upward trends and definition of the starting points for trend reversal. A proposal for a new groundwater Directive (replacing the existing one from 1980) was therefore published by the Commission in September 2005. It is now under examination by the Council and the EP. The Commission proposal for a groundwater Directive, and its implications for pesticides, will be analysed at point 5 of this document.

The WFD also forecast (annex V, 2.4) monitoring of the groundwater chemical status to establish the chemical status of all groundwater bodies determined as being at risk as well as the presence of any long term anthropogenic upward trend in the concentration of any pollutant.

## **4.2. “Good chemical” status for surface water and pesticides**

### **4.2.1. Existing EU surface water quality standards and their detection limits**

“Good chemical” status is achieved for pesticides in various surface water bodies when their concentrations is not in excess of the limit concentrations determined in Directives 91/414/EEC and

98/8/EC (see above). For surface water, standards are fixed only where the surface water is intended for the abstraction of drinking water<sup>16</sup>. In those bodies of water, for PPP and Biocides, a limit concentration is set between 1 and 5µg/l, depending on the water treatment, for the total concentration of parathion, dieldrin and hexachlorocyclohexane. In addition, the concentration of biocides (but not of PPPs), in these zones of drinking water abstraction, has to be limited to 0.1µg/l. *This inconsistency will be difficult to manage as it would be very difficult to know if a given concentration of an active ingredient in water is the result of its use as a PPP or as a biocide, when the same active ingredient is involved. Another inconsistency is that, for PPPs, the detection limit of the analytical method must not exceed a concentration which has an impact on non-target organisms deemed unacceptable<sup>17</sup> but that, for biocides, the detection limit has only to be lower or equal to 0.1µg/l.*

#### **4.2.2. Standards for EU relevant pollutants**

##### 4.2.2.1. Existing standards

Community standards existing at the time of entry into force of the WFD have to be continually observed. As far as pesticides are concerned, the Daughter Directives to the dangerous substances Directive 76/464/EEC<sup>18</sup>, Directives 86/280/EEC<sup>19</sup> setting emission limits and quality objectives for DDT, DDD, DDE and pentachlorophenol and 84/491/EEC<sup>20</sup> concerning mix of isomers of hexachlorocyclohexane and lindane have to be implemented. Directive 88/347/EEC<sup>21</sup> related to aldrin, dieldrin, endrin and isodrin from industrial production or formulation plants has not been taken on board by the WFD but might be subjected to a new proposal from the Commission.

##### 4.2.2.2. Setting standards for EU relevant pollutants

In November 2001, a list of 33 priority substances, which establishes Annex X of WFD, was adopted as a Decision by the EP and Council under the procedures laid down in article 16 of the WFD. The list identifies 33 priority substances. Among those 33 "priority substances", 11 are qualified as "Priority Hazardous" (PH), 14 other priority substances are considered for review as "Potentially Priority Hazardous" (PPH) and 8 other substances are priority substances not considered for review. Among the 33 substances, 21 are candidate endocrine disrupting substances, according to 2000-2002 BKH reports for the Commission<sup>22</sup>.

For the substance selection, the Commission has chosen a simplified risk based assessment procedure, which is based on the intrinsic hazards of a substance and available monitoring data about the occurrence of the substance in water (COMMPS- Combined Monitoring-based and Modelling-based Priority Setting procedure<sup>23</sup> closer to the application of the precautionary principle). *This is an important improvement from the classical and flawed risk assessment procedure which requires a theoretical exposure assessment based on emission pathway models, but a regression from the approach used in Directive 76/464/EEC<sup>24</sup>. With the adoption of the WFD, number of pesticides proposed for the "black list" under Directive 76/464/EEC are not be considered anymore as WFD abrogates article 6 of Directive 76/464/EEC which forecasts environmental quality standards (EQS) and emission norms for those candidate substances.*

For "priority substances", a progressive reduction in pollution is to be achieved by establishing Community-wide environment quality standards and source (emission) controls. For "priority hazardous substances", the cessation of discharges, emissions and losses shall be achieved within 20 years at the latest.

Nine priority substances are pesticides active ingredients which have been detected to be ubiquitous in European waters:

atrazine (PPH)	chlorfenvinphos (priority substance)
chorpyriphos (PPH)	diuron (PPH)
endosulfan (PPH)	isoproturon (PPH)
pentachlorophenol (PPH)	simazine (PPH)
trifluralin (PPH).	

All these substances except chlorfenvinphos are supposed to be subject to a review for identification as PH substances.

Three other pesticides or groups of pesticides are considered as PH substances: hexachlorobenzene, hexachlorocyclohexane and tributyltin compounds, these tributyltin compounds being biocides.

Other priority substances include substances used in pesticides as inert ingredients<sup>25</sup>.

For the first list of 33 priority substances, to be reviewed every four years, the Commission should have proposed standards and measures by 20 November 2003<sup>26</sup> but is running late. Those standards and measures need to be adopted by the EP and Council. If no agreement is reached, MS have to set national quality standards and control measures by 2007. Diffuse sources of pesticides would need to be addressed in order to achieve the quality standards or phase out all emissions. The WFD requests a review of biocides or PPP authorizations in order to meet quality standards set for priority substances.

#### **4.2.3. Setting standards at MS level**

MS are required to identify “pollutants of significance” for each of the water bodies. An indicative list of the main pollutants is provided in Annex VIII of the WFD. As far as pesticides are concerned, specific categories of substance in this annex VIII include: (i) organohalogen compounds and substances which may form such compounds in the aquatic environment, (ii) organophosphorous compounds, (iii) organotin compounds, (iv) substances and preparations, or the breakdown products of such, which have been proved to possess carcinogenic or mutagenic properties or properties which may affect steroidogenic, thyroid, reproduction or other endocrine-related functions in or via the aquatic environment, (v) persistent and bioaccumulative organic toxic substances, (vi) biocides and plant protection products.

Environmental Quality Standards (EQSs) for all pollutants identified as being discharged “in significant quantities” into bodies of water have to be set by MS, according to a procedure laid out in annex V, 1.2.6<sup>27</sup>, including public consultation. Those standards will have to be achieved by 2015. In setting EQSs, detailed data on the biological toxicity and the aquatic ecosystem need to be taken into account. Hence, EQSs are likely to differ from region to region and from water type to water type. This action of setting standards shall be coordinated in river basin management plans (RBMP), according to article 13 and Annex VII<sup>28</sup>. MS are required (article 14) to ensure a full and comprehensive public consultation in the production, review and updating of RBMP. A programme of measures (article 11<sup>29</sup> and annex VI<sup>30</sup>) shall be in place in 2009 and become operational in 2012. Such measures imply, for pesticides, compliance with measures required under the drinking water Directive and the PPP authorization Directive (see above) and the safeguard of water quality in order to reduce the level of purification treatment by water companies. However, compliance with measures under the biocides Directive are not listed in these examples of measures.

*If, some pesticides could be identified as “pollutants of significance” by some MS, EQSs could then be defined, locally, by MS. However, this is a far too complex approach which will anyway not take into account the combination effects of pesticides in water. The best approach will then remain to take specific risk reduction measures as mandatory parts of the river basin management, such as a no-spraying zone of 10 meters along watercourses and lakes and overall pesticide dependency / use reduction measures through an important promotion of integrated crop management and organic farming.*

## **5. THE GROUNDWATER DIRECTIVE**

### **5.1. Introduction**

Little is still known about the groundwater ecosystem but its biology is estimated to play a big role in its self-cleaning capacity. Therefore, traditionally, precautionary action (e.g. preventing the entry of pollutants) was applied. The 1980 groundwater Directive (80/68/EEC) followed a precautionary approach by preventing<sup>31</sup> groundwater pollution. It requires MS to prohibit substances of a “black list” (list I) which are persistent, bioaccumulative and toxic or of similar concern from entering the groundwater (zero-emission obligation) and to limit substances of a “grey list” (list II) from entering the groundwater. “Black list”<sup>32</sup> substances include organochlorine, organophosphorus and organotin pesticides and CMR<sup>33</sup> substances and “grey list” substances include all other pesticides<sup>34</sup>. But, Directive 80/68/EEC has not been able to meet the challenge of effectively preventing long term and diffuse groundwater pollution. A lack of instruments and of integration with other policies is the main reason for this.

*Unfortunately, the WFD did not take up this precautionary approach for groundwater and merely calls for the prevention<sup>35</sup> or limitation of the entry of substances without specifying what should be prevented and what should be limited to avoid rising concentrations and damage to surface water and terrestrial ecosystem. In line with the WFD approach to surface water chemical objectives, one could interpret this*

*objective similarly as being that all “hazardous” substances need to be prohibited from entering groundwater and that all other substances be limited to avoid rising concentrations and damage to surface water and terrestrial ecosystem.*

## **5.2. Pesticides and the new Directive proposal for groundwater protection**

In September 2003, the Commission published its proposal<sup>36</sup> for a new groundwater Directive dealing with measures to achieve good groundwater chemical status and criteria for the identification of sustained upwards trends in pollutants and definition of the starting points for trend reversal (see 4.1 and article 17 of the WFD). This proposal is now under examination by the Council<sup>37</sup> and the EP<sup>38</sup>. *The Commission proposal represents a serious weakening in the existing protection levels under the 1980 groundwater Directive.*

### **5.2.1. Quality standards at EU level**

Article 3 and annex I of the Directive proposal defines criteria for assessing good groundwater chemical status. Quality standards of 0.1µg/l have been fixed for active ingredients in pesticides, including their relevant metabolites, degradation and reaction products. *No sum parameter for pesticides is here determined as in the drinking water Directive and therefore no consideration is made of the possible combined effects. New low dose pesticides will be tolerated up to 0.1µg/l as well. In the groundwater Directive 80/68/EEC, no standard for pesticide was forecast but the precautionary strategy was based on emissions elimination or limitation.*

### **5.2.2. Prevention or limitation for pesticides from entering groundwater**

Article 6 deals with measures for MS to prevent or limit indirect discharges into groundwater and is supposed to “ensure the continuity of the protection regime established by existing groundwater Directive 80/68/EEC after its repeal by also establishing a link with the list of main pollutants indicated in Annex VIII of the WFD<sup>39</sup>”. It stipulates that MS programme of measures for each river basin district includes the prevention of indirect discharges to groundwater of any pollutants referred to in points 1 to 6 of annex VII of the WFD. These substances comprise organochlorines, organophosphorus and organotin compounds as well as proven CMR or endocrine disruptors which include pesticides. It also stipulates that for PPP and biocides (referred to in points 7 to 12 of annex VIII of the WFD), indirect discharges to groundwater shall only be permitted by MS on condition that the discharge does not put at risk the achievement of good groundwater chemical status which is fixed at 0.1µg/l for each individual pesticide and its residues. *There is indeed a lack of legally binding specific measures to prevent the input of the most hazardous substances (including pesticides) into groundwater while limiting all others. A strict requirement to guarantee the identification and listing of all hazardous pollutants, including those in the WFD annex VIII (referred to in points 7 to 12) is still missing. Provisions to ensure verifiable measures to prevent the input of such hazardous substances and to limit all other pollutants are missing as well.*

### **5.2.3 Identification of upward trends in concentration and starting point for trend reversal**

Annex IV of the proposal of a Directive forecasts that: (i) the identification of upward trends shall be based on arithmetic mean values of the mean values of the individual monitoring points in each bodies or group of bodies of groundwater bodies, as calculated on the basis of a quarterly, a half-yearly or annual monitoring frequency. All measurements below the limit of quantification shall be eliminated from the calculation. The minimum length of monitoring time series shall not exceed 15 years, (ii) trends reversals shall be focused on trends which present a risk of harm to associated aquatic ecosystems, directly dependent terrestrial ecosystem, human health or legitimate use of the water environment. Trend reversal shall take as its starting point a maximum of 75% of the level of the quality standards set out at annex I (0.1µg/l for each individual pesticide and its residues). *This means that no measures will be taken before rising contamination of a groundwater body or groups of bodies, reaches a concentration of 0.075µg/l for an individual pesticide (even for a new low dose pesticide and only if risk of harm is estimated unacceptable). This also means that likely combination effects will not be considered. The detection limit of the analytical methods used will also be crucial here. The same is valid for the monitoring design and frequency.*

## 6. CONCLUSIONS

Lack of harmonisation is observed between various legislations as far as surface and groundwater standards and authorization criteria for pesticide products authorization are concerned. The same is valid for the required detection limits of analytical methods.

One can also question the adequacy of the parametric value of 0.1 µg/l for each individual pesticide in light of new toxicological findings documenting low dose and/or long term effects of pesticides, particularly for children and the unborn and in light of the rising use of active ingredients effective at much lower dosage which are difficult to trace into the environment. We also can regret the lack of sum parameter for pesticides in surface and groundwater to limit the combined effects pesticides may have.

At present, the WFD does not seem to offer for pesticides in surface water the same level of protection as the one forecasted by the progressive implementation of the to be repealed dangerous substances Directive 76/464/EEC and, for groundwater, by the groundwater Directive 80/68/EC, to be repealed. Nevertheless, the public participation opportunities offered by the WFD should be used by NGOs as much as possible and might lead to some national improvements.

The WFD approach consisting of preventing the contamination of hazardous pesticides of concern at EU level from entering surface water is very useful and closer to the application of the precautionary principle, but more pesticides need to be addressed. Such an approach for pesticides should be decided for groundwater as well.

The approach consisting of leaving MS the possibility to set standards for surface water, according to local situation is very complex and expensive and will anyway not take into account the combination effects of pesticides in water. An essential and urgent complementary approach is then to take specific risk reduction measures as mandatory parts of the river basin management, such as a no-spraying zone of 10 meters along watercourses and lakes and overall pesticide dependency/use reduction measures through an important promotion of integrated crop management and organic farming. This needs to be made mandatory by the much awaited Thematic Strategy on the Sustainable Use of Pesticides.

## 7. NOTES AND REFERENCES

1. OJ L330, 5-12-98, p 32-54
2. Tap water, tank water, at the point where water is put in bottles or containers.
3. However, in the case of aldrin, dieldrin, heptachlor and heptachlor epoxide, the parametric value is 0,030 µg/l.
4. See consolidated text at [http://europa.eu.int/eur-lex/en/consleg/pdf/1991/en\\_1991L0414\\_do\\_001.pdf](http://europa.eu.int/eur-lex/en/consleg/pdf/1991/en_1991L0414_do_001.pdf)
5. See assessment of the relevance of metabolites in groundwater (doc. SANCO/221/2000), 25 February 2003, [http://europa.eu.int/comm/food/plant/protection/evaluation/guidance/wrkdoc21\\_en.pdf](http://europa.eu.int/comm/food/plant/protection/evaluation/guidance/wrkdoc21_en.pdf)
6. According to Directive 91/414/EEC, pesticides have to be used properly. But, the definition of "Proper use" is not clear: "Proper use shall include compliance with the conditions established under article 5 (no unacceptable effects) and specified on the labelling and the application of *good plant protection practice* as well as, whenever possible, the principles of integrated control". Principles of integrated control are not clearly defined either.
7. Council Directive 75/440/EEC of 16 June 1975 concerning the quality required of surface water intended for abstraction of drinking water in the MS, OJ L194, 25-7-75, p 26. This first generation Directive is expected to be integrated into the Water Framework Directive, whose article 7 requires MS to identify all bodies of water used or to be used for the abstraction of water intended for human consumption, to monitor them in order to verify their good status, the quality standards for priority substances and to ensure that, under the water treatment regime applied (whose level should be reduced), the resulting water will meet the requirements of the drinking water Directive. This prescription would have to be considered in the future revision of Directive 91/414/EEC.



8. This proposed analytical detection limit has to be compared with what is prescribed in the drinking water Directive (0,025 µg/l).

9. See [http://europa.eu.int/eur-lex/pri/en/oj/dat/1998/l\\_123/l\\_12319980424en00010063.pdf](http://europa.eu.int/eur-lex/pri/en/oj/dat/1998/l_123/l_12319980424en00010063.pdf)

10. Biocidal products are to be properly used. "Proper use shall include compliance with conditions established pursuant to Article 5 (conditions for issue of an authorization) and specified under the labelling provisions of this Directive. Proper use shall also involve the rational application of a combination of physical, biological, chemical or other measures as appropriate, whereby the use of biocidal products is limited to the minimum necessary..."

11. See note 7.

12. Unacceptable effects in water is calculated from the ratio PEC/PNEC (Predicted Environmental Concentration/Predicted No Effect Concentration).

13. Directive 2000/60/EC of 23 October 2000 establishing a framework for Community action in the field of water policy ([http://europa.eu.int/eur-lex/pri/en/oj/dat/2000/l\\_327/l\\_3272001222en0010072.pdf](http://europa.eu.int/eur-lex/pri/en/oj/dat/2000/l_327/l_3272001222en0010072.pdf)).

14. See also chapter on water in "EU Environmental Policy Handbook – A critical analysis of EU Environmental Legislation", European Environmental Bureau, 2005, pp 125-152.

15. Directives 78/659/EEC on the quality of freshwaters to support fish life, OJ L222, 14-8-78 ; 79/923/EEC on the quality of shellfish waters, OJ L281, 10-11-79 ; 80/68/EEC on the protection of groundwater against pollution and 76/464/EEC on the pollution of water by dangerous substances.

16. According to article 7 of the WFD concerning waters used for the abstraction of drinking water MS are required to ensure the necessary protection for bodies of water identified for the abstraction of drinking water with the aim of avoiding deterioration in their quality in order to reduce the level of purification treatment required in the production of drinking water.

17. Depending, for each pesticide, on its toxicity /exposure ratio for Fish and Daphnia or its algal growth inhibition/exposure ratio or its bio concentration factor (BCF).

18. Directive 76/464/EEC of May 4, 1976 on pollution caused by certain dangerous substances discharged into the aquatic environment of the Community, OJ L129, 18-5-1976. This framework Directive aims to control discharges of polluting substances featured on its lists: namely list I or "black list" of pollutants (identified on the basis of their toxic, persistent and bioaccumulative properties) which must be eliminated and list II or "grey list" of substances whose discharges must only be reduced. As far as list I substances are concerned, the Council has adopted a series of Daughter Directives. A Commission Communication dated June 22, 1982 (OJ C173, 14-7-1982) relating to dangerous substances liable to be featured in list I of directive 76/464/EEC, proposed 129 priority substances or groups of substances to the Council. These substances were regarded as requiring priority studies and appropriate proposals for Directives with a view to eliminating the pollution of the aquatic environment that they cause. Among these substances are number of pesticides which are now not considered as priority substances under the WFD or not considered in daughter Directives. Those substances might be considered, for standards setting, at MS level only.

19. OJ L181, 4-7-1986

20. OJ L274, 17-10-1984

21. Directive 88/347/EEC of June 16, 1988 amending the limit values and quality objectives for discharges of certain dangerous substances included in list I of Annex to Directive 74/464/EEC, OJ L158, 25-6-1988.

22. BKH Consulting Engineers (2000), *Towards the establishment of a priority list of substances for further evaluation of their role in endocrine disruption* [http://europa.eu.int/comm/environment/endocrine/strategy/substances\\_en.htm#r](http://europa.eu.int/comm/environment/endocrine/strategy/substances_en.htm#r) and RPS-BKH Consulting Engineers (2002), *Endocrine disruptors: study on gathering information on 435 substances with insufficient data.* [http://europa.eu.int/comm/environment/endocrine/documents/bkh\\_report.pdf](http://europa.eu.int/comm/environment/endocrine/documents/bkh_report.pdf)

23. [http://europa.eu.int/comm/environment/water/water-framework/preparation\\_priority\\_list.htm](http://europa.eu.int/comm/environment/water/water-framework/preparation_priority_list.htm)

24. See note 19.

25. Lars Neumeister, Pesticide Action Handbook, a guide for Central and Eastern European NGOs , Edited by S. Smolka and C. Weber, Pesticides Action Network Germany, 2003, [www.pan-germany.org](http://www.pan-germany.org)
26. A proposal for a “Directive on environmental quality standards and pollution control in the field of water policy and amending Directive 2000/60/EC” including, as an annex, a water priority substances new classification will be submitted to Commission inter-service consultation by 2 January 2006.
27. EQSs for water, sediment or biota setting will be based on LC50 and NOECs for Fish and/or Daphnia, and/or a representative of saline water and/or algae and safety factors. Where data on persistence and bioaccumulation are available, these shall be taken into account in deriving the final value of the EQS. The standards thus derived shall be compared with any evidence from field studies and where anomalies appear, the derivation shall be reviewed to allow a more precise safety factor to be calculated. The standard derived shall be subject to peer review and public consultation to allow a more precise safety factor to be calculated.
28. RBMP shall include (i) a summary of significant pressures and impact of human activity on the status of surface water and groundwater (estimation of point and diffuse sources of pollution with a summary of land use), (ii) a map of the monitoring networks and a presentation in map form of the results of the monitoring programme, (iii) a list of the environmental objectives (article 4) established for the different bodies of water, (iv) a summary of the programme of measures adopted under article 11.
29. Each programme of measures shall include “basic measures” including (i) measures to meet requirements of article 7 related to waters used for the abstraction of drinking: safeguard water quality in order to reduce the level of purification treatment, (ii) measures to prevent or control the input of diffuse source pollutants.
30. Annex VI, part B contains a non-exclusive list of “supplementary measures” such as measures required under the drinking water Directive (80/778/EEC as amended by 98/83/EC) and the PPP authorization Directive 91/414/EEC).
31. Prevention means here impeaching or limiting introduction of pollutants into groundwater.
32. See Directive 76/464/EEC, article 2.
33. CMR means carcinogenic or mutagenic or reprotoxic (but EU category not specified).
34. According to Directives 76/464 and 80/68/EEC, « grey list » include all biocides not in « black list ». At that time biocides meant all pesticides being PPP or biocides as no differentiation was made between them in the EU legislation.
35. Prevention here means progressive cessation of emissions.
36. Proposal for a Directive on the protection of groundwater against pollution, COM (2003) 550 final, 2003/01210 (COD) presented by the Commission.
37. Environment Council 24 June 2005: political agreement on the proposal for a Directive on the protection of groundwater against pollution, published 1 July 2005, 10746/05  
[https://dhs.rigikantselei.ee/ELdocs.nsf/e4053b6b4c0cc4d0c2256d12003fe6c4/090F523B8D54005EC22570340033F906/\\$File/st10746.en05.pdf](https://dhs.rigikantselei.ee/ELdocs.nsf/e4053b6b4c0cc4d0c2256d12003fe6c4/090F523B8D54005EC22570340033F906/$File/st10746.en05.pdf)
38. Position of the European Parliament adopted at first reading on 28 April 2005 with a view to the adoption of a Directive on the protection of groundwater against pollution.
39. Point 6.6 of the explanatory memorandum of the new groundwater Directive proposal.

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