JOINT POSITION PAPER

Pesticides in Drinking Water

September 2019

This position paper has been developed by the Health Service Executive (HSE) and the Environmental Protection Agency (EPA). This joint position paper provides a summary of the issues in relation to pesticides in drinking water including health, legislation and interventions.

FOREWORD

Pesticide products are used across a range of activities in Ireland by both professional and amateur users. If not used correctly, or if applied in unsuitable ground or weather conditions, pesticides can contaminate water bodies, some of which may be used as sources for drinking water supplies. A number of drinking water supplies in Ireland have been affected by exceedances of the limit set for pesticides by the Drinking Water Regulations in recent years. At the time of development of this paper, levels of pesticides found in Irish drinking waters have not presented an appreciable risk to human health. A summary of the issues in relation to pesticides in drinking water including health, legislation and interventions is provided below.

1: INTRODUCTION

1.1 Definition of pesticides

Pesticides is a broad term, encompassing herbicides, organic insecticides, fungicides, nematocides, algicides, rodenticides, slimicides, related products and their relevant metabolites, degradation and reaction products[1]. Among pesticides, herbicides represent the group most commonly detected in drinking water in Ireland to date. The word "pesticides" will be used in this document to refer to all pesticides, including herbicides. By their nature, pesticides are potentially toxic to other organisms, including humans, and must be used safely and disposed of properly[2].

1.2 Scope of pesticide use in Ireland

Pesticide use in Ireland is widespread, occurring across many sectors including agriculture, forestry, horticulture, transportation (e.g. roadside and railway verges), amenity (e.g. public parks, golf courses), industry, and domestic use in homes and gardens. The agriculture and forestry sectors account for the majority of pesticide use nationally. Pesticides may be used by land owners themselves or by third parties contracted to apply pesticides in agricultural or other contexts. Advice in relation to integrated pest management (IPM) and the use of pesticides is available from a range of sources, including agencies such as Teagasc and the manufacturers of pesticide products.

1.3 Mechanism via which pesticides can enter drinking-water

81.5% of Ireland's drinking water is sourced from surface water (lakes, rivers and streams), 11.5% is groundwater and 7% is sourced from springs[3]. Pesticides can enter surface or ground water bodies via either diffuse or source point routes.

Diffuse routes include:

- Direct application: e.g. to lakes or wetlands for the control of aquatic weeds or insects
- Run-off: Transport of pesticide-contaminated water and sediment from the surface of a field by overland flow to a non-target area, e.g. a river, due to a precipitation event
- Spray drift: Downwind movement of airborne spray droplets beyond the intended area of application
- Volatilisation: Evaporation or sublimation of a volatile substance
- Seepage through soil into groundwater
- Leaching: The process via which water-soluble chemicals are dissolved and pass through the soil into the groundwater.

Source point routes include pesticides entering drinking water from pesticide handling/ storage areas:

- Mixing
- Tank filling
- Spillages
- Washings and waste disposal
- Leakage from storage container.

Pesticides and their metabolites can enter water in solution, emulsion or bound to soil particles. Some pesticides are resistant to degradation and may persist and accumulate in water[1]. Conventional treatment of water in drinking water treatment plants in Ireland does not remove pesticides. As a result, any pesticides present in raw water sources are likely to pass through the treatment plant and into the drinking water distribution network.

2: LEGISLATIVE FRAMEWORK

2.1 Regulations and Limits

The European (Drinking Water) Regulations 2014 (Statutory Instrument 122 of 2014) (as amended) set out the parametric limits for pesticides in drinking water as illustrated in Table 1.

Table 1: Parametric limits for pesticides in drinking water

Pesticide	Parametric limit (µg/l)
Pesticides (individual)	0.10
Pesticides - Total	0.50
Aldrin, dieldrin, heptachlor and heptachlor epoxide	0.03

Further guideline and health-based limits specific to individual pesticides are developed by the World Health Organisation (WHO) and are discussed in Section 4.0. Without exception, the WHO limits, where available, are much higher than European Union (EU) parametric limits. The EU limits approximate a zero-tolerance policy for pesticides in drinking water. While the WHO values do not have a regulatory standing, they are valuable in the determination of any potential risk to human health presented by a breach of the EU regulatory limits.

EU Directive 2009/128/EC on the Sustainable Use of Pesticides (SUD) establishes a framework for European Community action to achieve the sustainable use of pesticides. The Directive is transposed into Irish legislation by the European Communities (Sustainable Use of Pesticides) Regulations 2012 (S.I. No. 155 of 2012). This legislation sets minimum requirements to reduce the risk to human and environmental health associated with pesticide use, including registration and training requirements for pesticide users. The SUD defines minimum setback distances from drinking water abstraction points within which the application of pesticides is prohibited to mitigate the risk of pesticides entering drinking water (Table 4, page 10).

2.2 Roles and Responsibilities

Since January 2014, **Irish Water** has been responsible for the provision of water in all public water supplies in Ireland. Regulation 4 of the Drinking Water Regulations requires Irish Water to ensure that the water it supplies is wholesome and clean.

The **Environmental Protection Agency (EPA)** has two areas of responsibility in relation to pesticides in Ireland:

a. *Pesticides in drinking* water: Under regulation 3(1) of the Drinking Water Regulations 2014 (as amended) the EPA is defined as the supervisory authority for all public water supplies

managed by Irish Water. The EPA is responsible for enforcement of compliance by Irish Water with the monitoring provisions, standards for drinking water and other requirements of the Regulations.

b. *Pesticides in the environment:* The EPA monitors priority substances, including some but not all pesticides, to determine whether river and lake water bodies are maintaining good status.

Local Authorities are the supervisory authority for regulated private drinking water supplies providing more than 10 m^3/day on average or serving more than 50 persons and supplies that have a commercial or public activity regardless of the volume supplied or population served. Local Authorities monitor compliance of these private water supplies with the standards set out by the Regulations and perform the same regulatory function over these supplies as the EPA does over public supplies. Regulated private water supplies include community-owned private rural water services, known as group water schemes. Group water schemes are represented and supported by the **National Federation of Group Water Schemes (NFGWS).** Local Authorities also have the role of providing advice and guidance to unregulated (exempted) private water supplies. Exempted supplies are those private supplies serving less than 10 m^3/day on average or serving fewer than 50 persons, provided that those supplies are not used in a commercial or public activity (such as a hotel or similar commercial outlet). An example of an exempted supply is a well serving a household for domestic use only. It is estimated that there are around 172,000 individual household wells in Ireland serving 470,000 persons or 10% of the population[4].

The **Health Service Executive (HSE)** is the single national body with statutory responsibility for the management and delivery of health and personal social services to the population of Ireland. The objective of the HSE is to use the resources available to it in the most beneficial, effective and efficient manner to improve, promote and protect the health and welfare of the public. The role of the HSE includes protecting the health of the public from potential chemical threats, such as pesticides. Under the Drinking Water Regulations, the HSE agrees actions with the Water Services Authority (WSA) to protect consumers' health where pesticides are detected in drinking water. Each time a breach of the regulatory limits for microbiological and/or chemical parameters is detected, Irish Water is statutorily obliged to notify the EPA. Where Irish Water or a local authority, acting as a provider of drinking water or as supervisory authority, in consultation with the HSE, considers that a supply of water intended for human consumption constitutes a potential danger to human health, Irish Water or the local authority shall ensure that agreed actions regarding the protection of consumers' health are followed.

Figure 1: Roles in response to an exceedance of the pesticide limit in a public supply

The role of the **Department of Housing, Planning and Local Government (DHPLG)** is in determining policy and funding in relation to public and private water supplies.

The **Department of Agriculture, Food and the Marine's (DAFM)** Pesticides Registration and Controls Divisions are responsible for authorisation of pesticide products used in Ireland and enforcement of the SUD and national Regulations controlling pesticide residues in food.

The **Commission for Regulation of Utilities (CRU)** is the economic regulator for public water services, responsible for ensuring that Irish Water operates in an economic and efficient manner.

Private supplies providing <10 m^3/day or serving fewer than 50 people and not part of a public or commercial activity are exempt from the Drinking Water Regulations. **Owners of these supplies** are responsible for the monitoring and management of their own supplies. As stated above, the Local Authority has a role in providing advice and guidance to these unregulated (exempted) private water supplies

The primary role of the **WHO** is to direct and coordinate health promotion internationally, within the United Nations system. The WHO strives to attain health objectives by supporting national health policies and strategies. The establishment of guideline values and health-based values for particular pesticides is one example of the WHO's supporting initiatives.

3: PESTICIDE MONITORING IN IRELAND

Irish Water is responsible for the monitoring of pesticides in public drinking water supplies in Ireland to determine that the quality standards set by the Regulations are met. The Drinking Water Regulations categorise 'pesticides' and 'pesticides total' as Group B (chemical) parameters which must be monitored in all public water supplies unless it can be shown by completion of a risk assessment (according to criteria set out in Part C of S.I. 464 of 2017) that they are unlikely to be present. The monitoring frequency is based on the volume of water distributed or produced each day within a supply zone. Irish Water monitors water samples for a specific list of pesticides which is developed in consultation with the DAFM based on the Department's knowledge of pesticide authorisation and usage in Ireland. Further pesticides are monitored if Irish Water has evidence or reason to believe they are used in the source water's catchment area or zone of contribution.

In terms of monitoring surface waters, some of which are used as drinking water sources, the **EPA** monitors for certain, but not all, pesticides and other priority and specific pollutants under the Water Framework Directive (WFD) Surveillance Programme. Some pesticides which are not currently subject to WFD regulation are also monitored where there is evidence that they are in use in the catchment and are likely to be detected. The EPA informs Irish Water of any detections of note captured by this monitoring programme which may have the potential to impact drinking water sources.

Local Authorities are responsible for the monitoring of pesticides in regulated private water supplies, including public and private group water schemes and regulated small private supplies in their functional areas.

Private supplies providing <10m^3/day or serving fewer than 50 people, such as private wells, are not covered by the Drinking Water Regulations, except where they supply water as part of a public or commercial activity. It is not the responsibility of Irish Water or of the Local Authorities to monitor these private supplies. The onus is on **private supply owners** to get their own supply tested. Private

wells in Ireland are at risk of contamination from pesticides and other hazards, including Verotoxigenic *Escherichia coli* (VTEC), which can pose a significant risk to human health. For this reason, it is very important that owners of unregulated private supplies ensure their water supply has appropriate treatment and that they monitor their water supply. The HSE can provide advice and guidance to the private supply owner on their water quality test results and the Local Authority can provide guidance on how to protect their well water source.

The EPA publishes annual reports which provide an overview of the quality of drinking water in public and private drinking water supplies. Table 2 summarises the operational and regulatory framework for public and private water supplies in Ireland.

Table 2: Summary of operational and regulatory framework for public and private water supplies

Supply Type	**Operated by**	**Regulator / Supervisory Authority**
Public Water supply	Irish Water	EPA
Private supply (regulated)		
a. Public Group Schemes	a. Irish Water manages abstraction and treatment. The community group water scheme committee manages distribution to consumers.	a. Local Authority.
b. Private Group Schemes	b. Local community group scheme committee.	b. Local Authority.
c. Small Private Supplies	c. Owner/manager of the commercial activity owner of a business or of public buildings using a well, private well owner.	c. Local Authority.
Household / private wells (unregulated/ “exempted” supply)	Householders or private well owners	While these supplies are unregulated/ “exempted”, the Local Authority is obliged to provide information to owners regarding appropriate monitoring of the supply.

4: PUBLIC HEALTH IMPLICATIONS/ HEALTH EFFECTS

4.1: WHO guideline values, health-based values, tolerable and acceptable daily intakes

At the time of development of this position paper, levels of pesticides found in Irish drinking waters have not presented an appreciable risk to human health[1]. However, any exceedance of EU parametric limits is undesirable and must be managed proactively. The WHO defines guideline values, tolerable daily intakes (TDIs) and acceptable daily intakes (ADIs) for some drinking-water contaminants[5].

- Guideline values are derived for many chemical constituents of drinking-water, including many pesticides. A guideline value normally represents the concentration of a constituent that does not result in any significant risk to health over a lifetime of consumption.

- In cases where a chemical constituent occurs in drinking water at concentrations well below health concern, the WHO does not calculate a formal Guideline Value. This is to dissuade Member States from incorporating a value into their national standards when this may be unnecessary for the protection of human health. In cases where a guideline value is not calculated, the WHO may determine a "health-based value" to provide guidance to Member States when there is reason for local concern.

- The TDI is an estimate of the amount of a substance in food and drinking-water, expressed on a body weight basis (milligram or microgram per kilogram of body weight), that can be ingested over a lifetime without appreciable health risk and with a margin of safety.

- ADIs are established for food additives and pesticide residues that occur in food for necessary technological purposes or plant protection reasons.

For chemical contaminants such as pesticides, which usually have no intended function in drinking-water, the term "tolerable daily intake" is more appropriate than "acceptable daily intake", as it implies permissibility rather than acceptability.

4.2: Potential health effects of pesticides in drinking-water in Ireland

A total of 19 individual pesticides account for all pesticide exceedances in drinking water reported in Ireland to end 2018. The four most commonly detected compounds accounting for pesticide exceedances in drinking-water in Ireland are MCPA, 2,4-D, Mecoprop and Clopyralid. These pesticides all belong to the chlorophenoxy herbicide group. Table 3 illustrates the WHO guideline value/ health-based value and TDI/ ADI for each of the 19 pesticides that have caused exceedances in Ireland.

Table 3: WHO guideline values, health-based values, TDIs and ADIs for pesticides causing exceedances in drinking-water in Ireland to end 2018

#	Pesticide (alphabetical order)	WHO Guideline Value µg/litre (mg/litre)	WHO Health-Based Values (mg/litre)	WHO TDI (µg/kg)	WHO ADI (mg/kg)
1	2,4-dichlorophenoxyacetic acid (2,4-D)	30 (0.03)	-	-	0-0.01
2	Atrazine (and its chloro-s-triazine metabolites)	100 (0.1)	-	-	0-0.02
3	Bentazone	-	0.5	-	0-0.09
4	Chlorpropham	*No WHO guideline value*	-	-	-
5	Clopyralid	*No WHO guideline value*	-	-	-
6	Dalapon	*No WHO guideline value*	-	-	-
7	Dicamba	*No WHO guideline value*	-	-	-
8	Dichlobenil	*No WHO guideline value*	-	-	-
9	Fluroxypyr	*No WHO guideline value*	-	-	-
10	Glyphosate	-	0-0.3 *(in combination with its major metabolite; aminomethylphosphonic acid (AMPA))*	-	-
11	Isoproturon	9 (0.009)	-	3	-
12	MCPA	-	0.7	-	0-0.1
13	Mecoprop	10 (0.01)	-	3.33	-
14	Metaldehyde	*No WHO guideline value*	-	-	-
15	Metazachlor	*No WHO guideline value*	-	-	-
16	Pentachlorophenol (PCP)	9 (0.009) *(Provisional guideline value. Considered provisional because of the variations in metabolism between experimental animals and humans)*	-	-	-
17	Pendimethalin	20 (0.02)	-	5	-
18	Picloram	*No WHO guideline value*	-	-	-
19	Triclopyr	*No WHO guideline value*	-	-	-

4.3: Health effects of chlorophenoxy herbicides, including MCPA

Box A: Limitations of scientific studies of the health effects of environmental exposures[6]

Any discussion of the potential health effects of an environmental exposure should be prefaced by an explanation of the limitations of the scientific evidence. These limitations include the following:

- *Level of evidence:* Randomised controlled trials are not an ethical possibility for investigation of the human health effects of pesticides, with researchers relying instead on animal and observational studies.
- *Generalisability of results of animal studies:* It is important to note that the doses of pesticide administered to experimental animals often greatly exceed the trace amounts that occur in drinking water in Ireland. For reasons including this, findings of animal studies may not be generalisable to humans.
- *Barriers to quantification of exposure at individual level:* Environmental exposures in humans, including exposure to pesticides, tend to be measured at aggregate, rather than individual, level. Indirect measures of exposure are often used, such as occupation and duration of employment. Even in well-designed studies it is difficult to quantify exposure to a chemical in drinking water at the level of an individual person over a defined time-period. Additionally, the health effects of specific individual pesticides are generally not quantified.
- *Bias:* Ecological studies are particularly vulnerable to bias.
- *Inability to infer causality:* It is problematic to infer a causal association between an environmental exposure and a health outcome, as there are often multiple confounders which may account for or contribute to outcomes.

Due to the methodological limitations inherent in the study of the health outcomes of environmental exposures, the precautionary principle is applied in establishing parametric limits for pesticides in drinking water. The precautionary principle effectively states that where evidence regarding the health effects of an exposure is inconclusive, the exposure should be reduced in so far as is practicable.

As mentioned in section 4.2, the four most commonly detected compounds accounting for pesticide exceedances in drinking-water in Ireland are MCPA, 2,4-D, Mecoprop and Clopyralid, all of which belong to the chlorophenoxy herbicide group. A number of factors provide possible understanding of their detection in drinking water compliance monitoring programmes. Herbicides in this group are in common usage worldwide. Many of the compounds in the group are highly water soluble. While some in the group have a relatively rapid degradation rates in the environment, some have been found to degrade at slow rates, particularly under anaerobic conditions.

Epidemiological studies have suggested an association between exposure to chlorophenoxy herbicides and two forms of cancer in humans; soft tissue sarcoma and non-Hodgkin lymphoma[5]. However, the results of these studies are inconsistent, precluding definitive pronouncements regarding the carcinogenicity of the compounds[5]. All chlorophenoxy herbicides, including MCPA, are classified by the International Agency for Research on Cancer (IARC) in Group 2B - "possibly carcinogenic to humans[5]."

MCPA accounts for the majority (approximately 75%) of all pesticide exceedances in Ireland. MCPA is a post-emergence (the weed has grown) herbicide widely used for the control of broadleaf weeds in agriculture and horticulture and on grassland and lawns[5]. MCPA is highly soluble in water. Surface water may be contaminated via spray drift and runoff, while groundwater may be contaminated via

leaching from soil. The target organs for MCPA are the kidney, liver and blood[5]. MCPA is not carcinogenic in mice or rats and exhibits no genotoxic potential[5]. Multigeneration studies in rats demonstrated no reproductive toxicity and MCPA was not found to be teratogenic (damaging to the foetus) in studies undertaken on rats and rabbits[5].

2,4-D is a systemic herbicide used for control of broad-leaf, including aquatic, weeds. 2,4-D is rapidly biodegraded in the environment. Based on available epidemiological studies, the Joint Food and Agriculture Organisation (FAO)/WHO Meeting on Pesticide Residues (JMPR) concluded that it was not possible to assess the carcinogenic potential of 2,4-D. As with all chlorophenoxy herbicides, 2,4-D is classified by IARC in Group 2B - "possibly carcinogenic to humans." JMPR also concluded that 2,4-D and its salts and esters are not genotoxic[5].

Effects of dietary administration of high doses of mecoprop in short-term and long-term animal studies include decreased relative kidney weight (rats and dogs), increased relative liver weight (rats), effects on blood parameters (rats and dogs) and depressed body weight gain (dogs).

There is no evidence of adverse health effects of clopyralid in humans[7].

5: INTERVENTIONS

Pesticide products authorised for use in Ireland are safe when used in accordance with the approved label instructions and supplied and used by registered and authorised persons. Preventing pesticides from entering the wider environment should be a priority for all stakeholders. Where breaches of the limits occur, potential interventions include the following:

- **Responsible use by all pesticide users**: key to addressing the issue of pesticide detections in drinking water is preventing pesticide products from entering source waters. All users of pesticide products should be aware of the potential implications of their activity for drinking water quality. Products should be used in accordance with the label's instructions and in suitable weather and ground conditions. Empty pesticide containers should be rinsed three times into the sprayer and applied to the target area, in accordance with the "7 Steps: Good Practice Guide for Empty Pesticide Containers" prepared by the EPA and the DAFM. Rinse water from containers should never be disposed of down a drain or into a watercourse.

- **Actions by Water Suppliers:** when a pesticide exceedance is detected, Water Suppliers should consult with the HSE in accordance with the EU Drinking Water Regulations. Water Suppliers are advised to investigate the detection by undertaking a phase of increased monitoring in the immediate aftermath of the exceedance. The locality of the intake for the supply should be inspected for evidence of nearby pesticide use. If use is identified which may be linked to the exceedance, the landowner should be consulted through the appropriate channels to make them aware of the potential implications of the activity on drinking water quality. Regular monitoring should continue until compliance has been confirmed. Pesticide products should not be used within a drinking water treatment plant site.

- **The National Pesticides and Drinking Water Action Group (NPDWAG)** is a multi-stakeholder group whose purpose is to support achievement of compliance with the pesticide limits set by the Regulations at the point of abstraction and in treated water. Initially established by the EPA in 2013, this group is now chaired by the DAFM. Membership of the NPDWAG includes representatives of the bodies listed in Box B.

Box B: Stakeholder organisation represented in the membership of the NPDWAG

- Animal and Plant Health Association
- Agricultural Consultants Association
- Department of Agriculture, Food and the Marine
- Department of Housing, Planning and Local Government
- Environmental Protection Agency
- Federation of Agrochemical Retail Merchants
- Golf Course Superintendents Association of Ireland
- Golfing Union of Ireland
- Hardware Association of Ireland
- Health Service Executive
- Irish Water and Ervia
- Irish Farmers Association of Ireland
- Irish Creamery Milk Suppliers Association of Ireland
- Local Authorities
- Local Authority Water Programme
- National Federation of Group Water Schemes
- Teagasc

The NPDWAG operates an approach of proactive and reactive engagement and awareness-raising. When made aware of an exceedance, all group participants engage with their own network of staff and stakeholders to raise awareness on the issue in the area relevant to the supply and its catchment. As a collective, through its members and their networks, the group promotes a culture of responsible use amongst all users of pesticide products. The group's membership and representation changes to respond to issues as they arise.

- **SUD:** DAFM's implementation of the SUD relies heavily on appropriate training of stakeholders at all levels of the industry, including Pesticide Advisors, Pesticide Distributors, Professional Users/Sprayer Operators, and Inspectors of Pesticide Application Equipment. The DAFM first prepared a National Action Plan for the Sustainable Use of Pesticides in 2013, which is subject to 5-yearly review. Setback distances set out in the SUD for the protection of water at abstraction points within which the application of pesticides is prohibited to mitigate the risk of pesticides entering drinking water are illustrated in Table 4. Enforcement action can be pursued by DAFM where there is failure to abide by setback distances.

Table 4: Minimum setback distances for the protection of water at abstraction points from pesticide application

Water Source	Distance
Abstraction point of any surface waters, borehole, spring or well used for the abstraction of water for human consumption in a water scheme supplying 100 m^3 or more of water per day or serving 500 or more persons	200 m
Abstraction point of any surface waters, borehole, spring or well used for the abstraction of water for human consumption in a water scheme supplying 10 m^3 or more of water per day or serving 50 – 500 persons	100 m
Abstraction point of any surface waters, borehole, spring or well used for the abstraction of water for human consumption in a water scheme supplying 1-10 m^3 of water per day or serving 10-50 persons	25 m
Abstraction point of any surface waters, borehole, spring or well used for the abstraction of water for human consumption in a water scheme supplying 1m^3 or less of water per day or serving 10 or less persons	5 m

- **Water Safety Plans:** In 2009, the WHO published detailed guidance on the implementation of the Drinking Water Safety Plan approach to the management of drinking water supplies. The approach involves the "source-to-tap" risk assessment of a supply, the identification of potential hazards to water quality, assessment of the level of risk associated with each hazard and identification of appropriate control measures. The use or presence of pesticides in the catchment and the risk it poses to drinking water is included in the approach. The focus is on preventative action. While there is no statutory obligation for water suppliers to employ the Drinking Water Safety Plan approach, the EPA has advocated for this proactive approach to supply management since 2009. The EPA has provided guidance in Advice Note No. 8: Developing Drinking Water Safety Plans. Suppliers across the public water schemes and private group water scheme sectors have begun to adopt this approach. Irish Water is undertaking the identification and risk assessment of hazards to determine those presenting low/high risk. This will, in turn, inform the scale and nature of risk reduction programmes required.

- **Treatment for the removal of pesticides**: Conventional treatment (coagulation, flocculation, filtration, disinfection) of water in drinking water treatment plants in Ireland does not remove pesticides. A number of non-conventional treatment processes can reduce pesticide levels in water. Use of granular or powdered activated carbon is the most commonly employed process for this purpose. Ultraviolet, reverse osmosis and nanofiltration have been shown to provide some degree of pesticide removal. Some pesticide compounds have proven difficult to remove, even with dedicated treatment. Removal of the molluscicide metaldeyhde has presented a particular challenge to water companies in the United Kingdom (UK). While treatment for the removal of pesticides is an option available to drinking water providers towards achieving compliance, this should only be considered when efforts to prevent contamination of source waters fail.

- **EPA enforcement actions:** As drinking water quality regulator for public water supplies, the role of the EPA is to ensure that Irish Water investigates the cause of any pesticide exceedance and takes corrective action to prevent recurrence. In 2013, the EPA published *EPA Drinking Water Advice Note No. 13: Pesticides in Drinking Water* to provide guidance on actions to be taken in the event of pesticide non-compliance. When any breach of the regulatory limits is detected, in addition to consulting with the HSE, the EPA requires that Irish Water undertake a programme of more intensive investigative monitoring to establish the prevalence of elevated pesticide in the supply in question. Where monitoring confirms a persistent issue, the EPA highlights these to Irish Water as priority supplies for action. Furthermore, the EPA can place such supplies on the Remedial Action List (RAL) and/or issue legally binding Directions to Irish Water requiring completion of actions to achieve compliance. This prioritised approach ensures that focus is directed to where it is needed most. In addition, the EPA encourages catchment-based monitoring of raw water sources, where possible, to assist in identifying sources of pesticide contamination.

- **Local Authority enforcement actions:** As the supervisory authority over regulated private supplies Local Authorities ensure that any failure to meet the pesticides parametric value is immediately investigated to determine its cause. It is the Local Authorities' role to ensure that remedial actions are carried out as soon as possible in supplies failing to meet the regulatory limits. They can direct private water suppliers to take appropriate measures to prevent, limit eliminate or abate any risk to human health. It is an offence for a private water supplier to fail to comply with a Direction issued by a local authority.

6: SUMMARY AND CONCLUSIONS

- Pesticides are potentially toxic to human health and must be used responsibly.
- EU Drinking Water Regulations define parametric limits for pesticides in drinking water, which approximate a zero-tolerance policy and are significantly lower than reference values determined by the WHO
- Improved monitoring of public water supplies for pesticides has taken place in Ireland in recent years but there remains a significant data gap regarding pesticide levels across unregulated private water supplies. Onus is on unregulated private supply owners to monitor their own drinking water.
- Monitoring of public supplies has demonstrated sporadic exceedances of the EU parametric limits for pesticides in drinking water, with the chlorophenoxy herbicide group accounting for the majority of exceedances.
- MCPA has accounted for approximately 75% of all exceedances.
- Scientific data regarding the human health effects of exposure to pesticides in drinking water are limited and inconclusive.
- At the time of development of this joint position paper, levels of pesticides found in Irish drinking waters have not presented an appreciable risk to human health.
- Exceedances of the EU parametric limits are undesirable in the context of scientific uncertainty regarding their potential health impact and must be addressed proactively.

In Ireland, the approach to ensuring compliance with EU Drinking Water Regulations is focused on preventing pesticides from entering drinking water sources. Education, training and awareness-raising amongst all stakeholders, including pesticide users, are key to minimising ingress of pesticides to source waters and, consequently, to minimising exposure of consumers to pesticides in drinking water. Implementation and enforcement of the relevant legislation is achieved via the efforts of multiple agencies, including Irish Water, the EPA, the HSE, Local Authorities and the DAFM. While treatment for the removal pesticides is an option available to drinking water providers towards achieving compliance, this should only be considered when efforts to prevent contamination of source waters fail. This is the joint position of the EPA and HSE regarding pesticides in drinking water.

Further information on pesticides in drinking water is available here:
https://www.hse.ie/eng/health/hl/water/drinkingwater/faq-pesticides.pdf

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Acronyms used in this Document

ADI – acceptable daily intake
CRU – Commission for Regulation of Utilities
DAFM – Department of Agriculture, Food and the Marine
DHPLG – Department of Housing, Planning and Local Government
EPA – Environmental Protection Agency
EU – European Union
FAO – Food and Agriculture Organisation
HSE – Health Service Executive
IARC - International Agency for Research on Cancer
IPM – integrated pest management
JMPR – Joint Meeting on Pesticide Residues
MCPA - (2-methyl-4-chlorophenoxy) acetic acid
NFGWS – National Federation of Group Water Schemes
NPDWAG – National Pesticides and Drinking Water Action Group
SUD – Sustainable Use (of Pesticides) Directive
TDI – tolerable daily intake
VTEC - Verotoxigenic *Escherichia coli*
WFD – Water Framework Directive
WHO – World Health Organisation
WSA – Water Services Authority