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DWI Information Letter 03/2023

24 August 2023

To: Board Level and Day to Day Contacts of Water and Sewerage Companies and Water Companies in England.

Dear Sir/Madam

The application of the Water Industry Act 1991, Water Supply (Water Quality) Regulations 2016 (as amended) to proposed new water recycling or desalination schemes

1. Purpose

1. This Information Letter sets out the current drinking water quality regulatory framework and how this applies to proposed new resource schemes which use either water recycling (recovering and reusing water from wastewater) or desalination to supplement the public water supply.

2. Background

1. Due to the need to provide sustainable drinking water supplies, water companies are starting to consider utilising alternative source waters, such as water recycling and desalination which may augment or supplement traditional sources of drinking water (for example surface or groundwater). New source schemes which have either come online or will be introduced include water recycling and desalination. Some of the new schemes are being progressed through the Regulators' Alliance for Progressing Infrastructure Development (RAPID) and others are being proposed in company Water Resources Management Plans (WRMPs) stemming from the Regional Water Resource Group plans.

2. This information letter gives water companies further guidance on the application of the Water Industry Act 1991 ('the Act') the Water Supply (Water Quality) Regulations 2016 (as amended) ('the Regulations') when developing and introducing such schemes and should be read in conjunction with previously issued guidance on implementing the Regulations and guidance on the Long-Term Planning of Water Supplies.

3. Application of the Regulations

1. The Inspectorate expects that water suppliers will meet their statutory obligations relating to the quality of their drinking water supplies.

2. Under section 68 of the Act water undertakers and water supply licensees have a statutory duty to supply wholesome water. Regulation 4 of the Regulations sets out wholesomeness requirements for water supplied to premises for domestic purposes. All new resource schemes, whether that includes a water recycling or desalination component must be designed to meet the requirements of regulation 4. Regulation 4 details that for water to be wholesome it must not contain any of the named parameters in the schedules in contravention of the Prescribed Concentrations and Values (PCV) nor must it contain any other micro-organism, parasite or substances at a level which could be a potential danger to human health.

3. For both recycling and desalination schemes, securing wholesomeness will require an understanding of the nature of the source water, risk assessment and consider the use of the multi-barrier approach. This will include a need to understand any emerging contaminants that are present and consider expert opinion on drinking water safety, research and independent medical advice from UK Health Security Agency (UKHSA).

4. To comply with the wholesomeness standards set out at regulation 4, drinking water must also conform to the taste and odour standard. Pursuant to table B of schedule 1, to be wholesome, the taste and odour of drinking water supplies needs to be acceptable to consumers and subject to no abnormal changes.

5. The Inspectorate considers early engagement with consumers is key to mitigate acceptability issues relating to taste and odour for recycling and desalination schemes, especially whenever there is a change in source water, or a new source is used. The Inspectorate therefore expects companies to effectively plan and implement early engagement with sufficient time to reassure consumers about any potential changes to the taste and odour of their drinking water.

6. The remineralisation arrangements in many cases will be a key consideration to consumer acceptability, both of the water itself, and when it is mixed with existing sources in the area where it is augmenting a supply. The risks associated with corrosivity of a differing mineral content in the receiving waterbody, treatment and downstream supply system receiving an input of recycled or desalinated water must be fully understood by using tools such as the Langelier Index. This will help inform the remineralisation strategies required to mitigate the risk of adverse effects on the treatment process and leaching of metals and other substances in raw water storage and the downstream supply system which could pose a risk to consumers.

7. Water recycling may pose specific new challenges in terms of acceptance by consumers of the recycled nature of the water. Water companies will need to mitigate these specific new risks. Early consumer engagement is seen as a key measure to ensure acceptance including any additional information that explains the nature of water recycling and its ability to consistently produce wholesome drinking water. The Inspectorate has published research on the public perceptions to recycled water.

8. Regulation 15 specifies sampling arrangements for new sources, which are those that have never been previously used, or have been, but not for the preceding six months. Whether recycling or desalination constitute new sources under regulation 15 will depend on the operation of the plant. Where recycled water is supplied directly to a treatment works the water recycling plant would be considered part of the treatment process and likewise where desalinated water is supplied directly to a works or into a network a regulation 15 application must be made, and regulation 31 also applies (see 16).

9. When recycled or desalinated water supplies an environmental buffer, such as a surface water body, a river, or a groundwater aquifer, then regulation 15 does not apply, but the existing risk assessments must be reviewed and updated. Variations in the contribution of the recycled or desalinated water to the overall volume of the source must be taken into account in the risk assessment, for example during drought conditions the contribution is likely to be higher.

10. Regulation 15 applies to a new source for abstraction and also applies to a new input to an existing source where the contribution is expected to be the greater part (greater than 50%) of the total volume abstracted under proposed and foreseeable conditions. If less than 50% the regulation 27 risk assessment must be updated. However, each case should be individually assessed as to what

constitutes a new supply, as mixing of some types of water which are significantly different from the receiving water may cause significant impacts earlier than 50%.

11. To inform the regulation 27 risk assessment (and the regulation 15 submission if required), appropriate sampling will be required, both of the new input, and of the water body itself to demonstrate that the requirements of section 68(1) of the Act are met in respect of the duty of ensuring no deterioration of the raw water source or combination of sources, and to determine any changes in the treatment necessary to ensure the water supplied to consumers remains wholesome and remains at a similar or better quality, prior to the introduction of the new source.

12. Regulation 26 covers disinfection and other treatment arrangements. To meet regulation 26, the nature of the recycled or desalinated water will need to be understood so that the disinfection policy used remains appropriate and informed by sound science, be unambiguous, documented and verifiable. Appropriate safeguards must be in place to prevent out of specification recycled or desalinated water compromising the disinfection stage.

13. For recycling and desalination, additional considerations apply if the recycled or desalinated water has a remineralisation component. Regulation 26(6)(b)(ii) requires the water being presented for disinfection has a turbidity of less than 1 NTU. Considerations for the remineralisation process include that any remineralised water has sufficient reaction time and appropriate safeguards are in place to ensure regulation 26 is always met and is verified. For instance, where remineralisation is prior to disinfection it must be complete before so as not to interfere with free chlorine or reduced transmissivity for UV, for example.

14. Regulation 27 and 28 requires a comprehensive risk assessment for every supply system (from catchment through to the consumer stages) which must cover all hazards and hazardous events which could present a risk of supplying water that could cause a risk to public health or an unwholesome supply. When updating an existing risk assessment to include an element of desalination or recycled water, any additional or revised risks must be assessed, together with demonstration of the capability of the existing treatment processes to mitigate them. If they cannot, short term mitigation must be identified, together with treatment upgrades that will mitigate those risks and ensure wholesome water is produced at all times. Consideration must be given to sufficient monitoring on the inlet of recycling plants to monitor the effluent entering the works so that there are

sufficient safeguards in place to adjust or protect the subsequent treatment stages.

15. Water suppliers are required to ensure that the risks associated with recycled or desalinated water are adequately documented and assessed within the regulation 27 risk assessments and any identified required mitigation is implemented prior to the supply of water. Additional risks associated with recycled or desalinated water may occur at the abstraction and treatment stages (due to a change in nature of the source water) and distribution/consumer stages associated with corrosivity and acceptability risks. For desalination schemes the risk of boron should be considered.

16. Regulation 31 sets out the requirements for substances and products which come into contact with water supplied for regulation 4 purposes that is intended for human consumption, to ensure they do not cause the water supply to become unwholesome.

17. Regulation 31 approved products have been tested to ensure they do not cause risks to water intended for human consumption and also final drinking water quality from the leaching of contaminants, some of which could pose a risk to health or taste and odour risk.

18. For recycling and desalination, the Inspectorate expects all components of the recycling or desalination plant to meet regulation 31 where the water is supplied directly to the receiving treatment works that is downstream of where the water is abstracted from the environment, or into supply.

19. Water companies using membrane technology should work with their suppliers to ensure that membranes and other components used in the recycling process hold appropriate approval under regulation 31.

20. Where recycled or desalinated water is used indirectly in that it is discharged into an environmental buffer for example a raw water storage reservoir or other water body such as a river, the regulation 27 risk assessment must be updated. This should include the use of the recycled or desalinated water under drought conditions where the flow from the body of water may result in a higher proportion of the desalinated or recycled water than under normal operating conditions. The Inspectorate accepts that there is no universally accepted definition of what constitutes an environmental buffer, however the Inspectorate considers it would meet the definition if the receiving water body is

an integral part of the environment such as a lake, is not part of the purposeful process of a water treatment works such as after abstraction, and the volume of the environmental buffer is at least $10m^3$ greater than the anticipated maximum daily abstraction volume. Each case should be individually considered, so for instance, bankside storage may be considered as an environmental buffer if it already receives water from, for example, a river and if it can be demonstrated that the input of the recycled or desalinated water and retention time and mixing within the bankside storage has been considered in the regulation 27 risk assessment and does not introduce further risks to the existing quality of the raw water and downstream treatment and distribution stages. It would not be considered as an environmental buffer if, for example, the storage is the sole recipient of desalinated or recycled water, as this would be effectively a balance tank, even if the size criteria were to be met.

21. Where the water is being used to augment an environmental buffer, the risk assessment associated must identify specific risks deriving from the materials used in the composition of the products and mitigation implemented accordingly.

4. Enquiries

1. This letter is being sent electronically to Board Level and Day to Day Contacts. Please acknowledge receipt by email to dwi.enquiries@defra.gov.uk. Hard copies are not being sent but the letter may be freely copied.

2. Copies of this letter are being sent to: Craig Turner, Chief Executive, Water UK; Davide Minotti, Deputy Director Water Services, Department for Environment, Food and Rural Affairs; Sue Petch, Drinking Water Quality Regulator for Scotland; Berni Corr, Drinking Water Inspectorate for Northern Ireland; Karen Gibbs, Catherine Jones and Emma Clancy, CCW; Alison Cullen and Paul Martin, Ofwat; Anne Dacey, Environment Agency; Nadeem Raja, Food Standards Agency; Stephen Robjohns, UK Health Security Agency; Richard Thompson, Environment Agency.

Yours sincerely

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