



## **Guidance Note: Long term planning for the quality of drinking water supplies**

# **GUIDANCE NOTE ON LONG TERM PLANNING FOR THE QUALITY OF DRINKING WATER SUPPLIES**

## **1. Purpose**

1.1. The purpose of this Guidance Note is to provide water companies and other stakeholders with guidance on long term planning for the quality of drinking water supplies.

1.2. This long term planning guidance note is not intended to be a comprehensive review of water supply practice. There are no new policy initiatives set out herein, and no new legal obligations. The focus is on delivery of existing obligations, including recent and imminent legislative changes, using current good practice within a long term planning context.

1.3. The guidance note also provides advice on how the Inspectorate might assist companies in the periodic review process for setting of prices, led by Ofwat, including details of arrangements for information submissions to the Inspectorate; the Inspectorate's assessment processes; and a timeline for supporting current expectations of PR19 requirements. It takes account of current draft Ministerial guidance to Ofwat on strategic priorities and objectives from both the Welsh Government and the UK Government.

1.4. We will update this document as necessary to take account of developments in legislation, policy and industry good practice and future periodic reviews. The Inspectorate welcomes comments on the document, including suggestions for areas or matters not currently included.

1.5. The regulatory framework that sets the context for this Guidance Note is summarised in our [Guidance on the Regulations](#): Introduction to the Public Water Supply Regulations in England and Wales.

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### **3. Principles of approach**

3.1 The Inspectorate expects all water companies to take a source to tap approach to manage their water supplies to protect the health of their consumers, and maintain consumer confidence in the supply and services provided. Central to achieving these objectives is the mandatory use of drinking water safety plans. This is current national and international good practice for water supply management.

3.2 The delivery of this approach should be efficient and sustainable, and contribute to a lasting legacy of long term benefit for both the company and its consumers. To have legitimacy, and to gain the support of the Inspectorate, this approach needs to be transparent about short and long term investment requirements, for current consumers and future generations.

3.3 For all aspects of planning, whether for event management, drought management, water resource management, maintenance management or operations management, it is a fundamental requirement that drinking water quality is always central to, and accounted for, in all cost benefit assessments of options considered. It is expected that companies will always plan to meet their statutory obligations for drinking water quality.

3.4 The sustainability and resilience of the quality of supplies are important for services to consumers, and need to be an integral part of all planning and delivery functions of a company. It is expected that companies will plan for their needs from a stewardship perspective across generations of consumers. To do so, companies will need to foster and develop their supply chain to facilitate and retain the knowledge and skills that are the bedrock for building efficient and innovative solutions and service. In respect of routine operational resilience, it is expected that every company will proactively plan for the containment and recovery from potential events that might otherwise impact on consumers, with a view to maintaining levels of drinking water quality protection, confidence, acceptability and service.

3.5 Given the relative stability of the legislative framework for the quality of drinking water supplies, and the consistency of approach over time, the Inspectorate expects that

companies' operations and maintenance arrangements should consistently, proactively and sustainably meet all statutory obligations, while addressing any localised changes to risk profiles as happen from time to time, using established risk assessment reporting processes. We believe that this is at the heart of the relationship between a water company and its consumers, underpinned by the embedded company culture and staff behaviours that support the daily endeavour necessary to maintain a level of quality and service that meets consumers' expectations, and is how problems are dealt with when they arise. By its activities over time, the company demonstrates its trustworthiness, to gain the trust and confidence of its consumers.

3.6 References in this Guidance Note to the Act and the Regulations are to the Water Industry Act 1991 (and updates/amendments), and the Water Supply (Water Quality) Regulations 2016 for England and the Water Supply (Water Quality) Regulations 2010 (as amended) for Wales. Links to these and other relevant key legislation can be found [here](#) .

## **4. Broad considerations in planning for the long term**

### **4.1 Risk assessments**

4.1.1 It is mandatory for water companies to carry out risk assessments of all of their water supply systems, from source to tap, adopting a drinking water safety plan approach. The risk assessment reports subsequently submitted to the Inspectorate should identify the hazard (or partially mitigated hazard) and any associated parameters; evidence that the cause of the hazard has been identified and confirmed; and the range of options for mitigation considered including, where appropriate, catchment management measures. There must also be a clear statement of how the benefits delivered by the actions will be measured (to include the scope, frequency and location of monitoring).

4.1.2 Companies are required to keep under review, their risk assessments for all of their water supplies, and to report updates to the Inspectorate. In doing so, they should have regard to any learning from events or near misses that is circulated by the Inspectorate or companies from time to time.

4.1.3 If a regulatory risk assessment identifies clear actual or potentially significant risks, the company must manage and mitigate the risks from the hazard in a timely, effective and efficient manner to the benefit of consumers. The Inspectorate may consider putting in place a legal instrument to ensure that desired outcomes are achieved.

### **4.2 Catchment management**

4.2.1 Catchment management schemes have been widely used by water companies to address both point source and diffuse pollution, such as nitrate and pesticides. There are many benefits to catchment management approaches that address pollution at source: such schemes benefit the wider water environment; reduce the need for, or burden on, water treatment facilities; and provide sustainable, long-term, cost effective solutions. They remain the first consideration of all source to tap risk assessments to reduce risks prior to treatment and ultimately mitigate all significant risks to public health, wholesomeness and acceptability of water supplies

4.2.2 The Inspectorate has actively promoted catchment management approaches for many years, including incorporating their use in legal instruments arising from compliance failures, or identified risks.

4.2.3 The likelihood of success of catchment management measures varies depending on the nature of the parameter, the size and nature of the catchment, the origin of the pollution and other factors. Therefore, individual proposals will be assessed on their merits.

4.2.4 The accumulation of catchment management improvements gained from a multiplicity of proactive integrated solutions (such as stakeholder engagement at both national and local levels; pollution control; raw water management; abstraction control; and raw and/or treated water blending) may negate or delay the need for, new and/or upgraded treatment processes. In addition catchment management offers protection of the quality of water supplies.

4.2.5 For such solutions to be effective and sustainable, they require the commitment of significant resources and multiple interactions over a prolonged period by companies, and often require the co-ordination of outputs to be delivered by various third parties. Although control of the hazard at source is always the primary objective, where catchment management solutions are specified, we recognise that the full delivery of outcomes via catchment management measures may be uncertain, or may prolong the period before benefits accrue to consumers. To ensure that a legal instrument is fit for purpose, the Inspectorate will need to understand these constraints, and the other actions that the company may need to take, or to make provision for, to supplement its catchment management activities, including the relative contribution of catchment management activities to outcome delivery; the potential impact on priorities; the timescale for completion; and the arrangements for programme recovery, if needed.

4.2.6 The Inspectorate will continue to pursue this policy, and will encourage companies to routinely incorporate catchment management solutions as a fundamental part of their source to tap management of their water supplies. This approach is consistent with wider environmental considerations, including delivery of the provisions of the Water Framework Directive (WFD), Article 7. We will support companies, working with the stakeholders and Regulators involved, to find and implement the most cost effective, efficient and sustainable solutions to deliver the required outcomes. We will continue to work with other Regulators to facilitate the scope and specification of catchment solutions where there are synergies with environmental drivers, and we expect companies to liaise with their local environmental Regulator representatives on the development of their catchment management solutions.

4.2.7 Whilst the most significant catchment management schemes, from a drinking water quality perspective, will continue to be incorporated within legal instruments, we expect companies to routinely engage in proactive catchment management activity as a matter of good practice for all of their water supplies.

### 4.3 Resource and supply management

4.3.1 The Inspectorate expects water companies to meet their statutory obligations under section 68 of the Act, including, their duty to supply wholesome water.

4.3.2 Section 68(1)(b) of the Act also places the following duty on a company that may have implications for how it develops its water resource plans:

*It shall be the duty of a water undertaker..... so far as reasonably practicable, to ensure, in relation to each source or combination of sources from which water is so supplied, that there is, in general, **no deterioration** in the quality of the water which is supplied from time to time from that source or combination of sources.*

4.3.3 This duty may have an impact on both transfers of water within a company's supply area, and for exports and imports across company boundaries. Two general principles to take account of are as follows:

- a. that the company should not expose consumers to a greater risk of exposure to unwholesome water, and
- b. that the company must always plan to meet its water quality obligations.

4.3.4 To demonstrate compliance, companies are expected to have carried out risk assessments on the potential impacts on public health, wholesomeness and acceptability to consumers of new or altered supply arrangements, including within- and cross-boundary transfers of drinking water supplies. This includes consideration of potential consumer acceptability issues, and implications for asset health and supply management. If there is the potential for consumers' supplies to deteriorate, then, prior to making the supply changes or transfer, a company must take steps to mitigate that risk (by any appropriate means, including, for example, treatment, blending and/or consumer communications).

4.3.5 Specific matters for consideration when developing proposals for new sources (including the reintroduction of an existing source, bulk supplies and transfers that have been out of supply for 6 months or more) should include (where relevant) the following:

- a. For all water transfers, both within a company's area and across boundaries, and for new sources, a company is expected to have carried out risk assessments of the potential impacts on public health, wholesomeness, and acceptability to consumers, and must meet regulatory requirements for the introduction of new sources;
- b. The company should be satisfied that the risk assessment has considered the potential impact of mixing of different water types within its distribution network, including customer acceptability issues and the operation and maintenance requirements of that particular network (e.g. for event mitigation, water stability and age and service reservoir turnover);
- c. Routine operational matters to be included in these risk assessments should include assessment of the impact on optimisation of phosphoric acid dosing, pH and colour for plumbosolvency control; fluoridation practices; other chemical stabilisation processes; and compliance with disinfection and the minimisation of disinfection by-products;
- d. Transfers of water, or commissioning of new sources, that increase the risk of non-compliance, such as by discolouration, objectionable tastes and odours, nitrates or pesticides, should not be permitted until steps to mitigate those risks are in place;

- e. Where it is proposed that a new supply replaces an existing supply from a source that is then to be abandoned or not available (perhaps due to changes to an abstraction licence), the cost benefit of the proposal must include the whole life costs of managing the quality of the new supply, including treatment costs, pumping costs and network maintenance costs; and
- f. It is the responsibility of the company receiving a transfer to satisfy the regulatory requirements for the introduction of new sources, and to ensure compliance with the Regulations. The recipient company must complete a risk assessment for the water supply (source to tap). If the recipient finds that the supply is already in use by the supplying company, it must seek and obtain relevant information from the supplier to complete its risk assessment. The risk assessment would need to be informed by analysis carried out by the receiving company. Where a new connection/transfer operates in both directions, both receiving companies should submit risk assessment reports for the relevant supply systems, plus the associated analytical results as soon as is reasonably practicable.

4.3.6 The Inspectorate interprets the statutory requirement for 'no deterioration' by reference to compliance with the requirements of the Regulations, including standards. A marginal change in the concentration or level of a parameter may not be considered as deterioration if the water as supplied remains wholesome and is acceptable to consumers, provided that the company can demonstrate that it has considered and limited the deterioration as far as is reasonably practical to do so.

4.3.7 Companies are aware of the need for consideration of drinking water quality impacts from changing blends or supply source, or the introduction of a new water source, which can change the chemical character of a supply, or disrupt plumbosolvency measures, and fluoride or other targeted conditioning arrangements. Proposals to transfer water that increase the risk of non-compliance, or of consumer complaints about the aesthetic character of the water supply, such as by taste and/or odour, discolouration, nitrates, pesticides or bacteriological challenge, will not be permitted until steps to mitigate those risks are in place.

4.3.8 The Inspectorate considers that the obligations on water companies and other stakeholders in the provision of alternative water sources or of bulk supplies across company boundaries (or indeed wider distribution within company boundaries) is adequately covered by existing legislation to ensure consumers are protected. We intend to continue using these existing tools to regulate source changes and the movement of water across and between company areas, and the attention of companies is drawn to previous advice and guidance provided by the Inspectorate on related topics, including on managing metaldehyde and other pesticides; on water resource planning; on regulation 15 compliance arrangements; and on management of common carriage.

4.3.9 These principles align with the Environment Agency's principles on water transfers as potential options to resolve supply-demand deficits and improve resilience (section 4.10 of EA's WRMP guideline refers).

4.3.10 It continues to be the duty of a company's Board Level contact to personally confirm the integrity of the risk assessment process put in place by the company for all of its water

supplies. To confirm that every company complies with its duties on drinking water quality matters in its broader resilience and resource planning arrangements, the Inspectorate requests written assurance in the form of a signed statement from the Board Level Contact for each company that the company's draft Water Resources Management Plan (WRMP) takes account of all statutory drinking water quality obligations, and that the WRMP includes plans to meet their statutory obligations in full. This statement should be sent to the Inspectorate when the company's final draft WRMP is submitted to Ministers for approval, and it will inform any advice that the Inspectorate may subsequently provide to Ministers that is relevant to their decision.

#### 4.4 Raw water deterioration

4.4.1 Localised changes to raw water quality occur occasionally requiring a review of existing risk profiles. Failure or a likelihood of failure to supply wholesome water because of a deterioration in raw water quality (such as nitrate, pesticides, turbidity, THMs (and precursors), colour, *Cryptosporidium* and other pathogens) should be identified through raw water monitoring and the risk assessments carried out for each treatment works and its associated supply system. Deterioration in this context means a measured change in raw water quality over time, or demonstrable unmitigated volatility in quality changes brought about by pollution changes within the catchment, and most frequently arising from diffuse pollution, but occasionally from changing weather patterns. It does not mean evidence of poor performance of a treatment works within its design parameters.

4.4.2 Most hazards will be known about already within existing risk assessment arrangements. However, where a deterioration in raw water quality has been identified and presents a risk to consumers (for example, the existing treatment process is not designed to deal with either the type or level of the contaminant), water companies must investigate the cause of deterioration and take action to protect consumers. This action should primarily focus on investigations in the catchment and, where feasible, specific actions to control the level of pollution entering the supply at source, although a wide range of other operational interventions, or short-term or permanent treatment solutions, may be necessary to supplement catchment activity.

4.4.3 When considering catchment management/control solutions, companies should have regard to the specific obligations of the WFD. However, the capacity of a company to provide for multiple drivers will depend on the level of risk to drinking water quality and whether a catchment solution could deliver in time to prevent the supply of unwholesome water. In some situations, a treatment solution may need to be installed, and companies will be required to adopt a twin track approach that includes treatment or other operational control measures in addition to catchment management actions to mitigate the risks to consumers from raw water deterioration.

4.4.4 Companies also have a statutory duty to undertake monitoring of raw water at every abstraction point as part of their risk assessment of each treatment works and associated supply system. These activities by water companies will contribute to the WFD objectives in respect of the protection of areas from which drinking water is abstracted.

## 4.5 Pesticides

4.5.1 Currently there are about 30 Undertakings in place that address various circumstances of non-compliance with standards for pesticides (including metaldehyde, clopyralid, carbetamide and propyzamide), many of which are not easily removed by existing water treatment processes.

4.5.2 Over half of these programmes of work relate primarily to catchment management programmes of work, and are due to be completed by March 2020. Interim summary reports of progress to date were submitted to the Inspectorate in March 2017. Other pesticide undertakings are currently in place for bulk supplies (monitor and liaise), new sources, or upgrading treatment works (primarily for other parameters with expected benefits for pesticides).

4.5.3 Water companies have taken significant steps in recent years to deliver the outcomes committed to in these Undertakings, i.e. compliance with the pesticides standards. The numbers of compliance failures have been reduced, as reported by the Chief Inspector in his quarterly and annual reports, often by operational measures such as abstraction control and blending. These measures will need to continue, and their use extended.

4.5.4 Companies have also engaged extensively at national level (pesticides manufacturers, suppliers, and representatives of the agriculture sector) and local level (individual farmers, agricultural contractors, and their advisors) to mitigate the pollution of raw water sources by pesticides. There have been co-operative and productive discussions within bodies such as the Metaldehyde Stewardship Group and the Voluntary Initiative to share understanding of the issues involved for all stakeholders, and to identify and disseminate learning and evolving good practice in the formulation, labelling and field application of pesticides to minimise pollution. Individual water companies have undertaken a range of pilot studies to identify the most cost effective, efficient and sustainable catchment management solutions and alternative solutions for their specific circumstances and supply systems.

4.5.5 The Inspectorate will publish, in autumn 2017, the findings of its review of progress to date with delivery of the Undertakings, with a view to sharing the learning from the various solutions investigated to date. We will also invite companies to review their existing Undertakings, and to submit to the Inspectorate by the end of 2017 updated programmes of work, where necessary, to deliver compliance with the pesticides standards. Companies should identify the bespoke solution(s) required to achieve sustainable compliance for each of its supply systems, taking an approach that focusses primarily on catchment management solutions. The individual schemes in the programme of work for each supply system should be prioritised within the best practicable timetable for delivery. Proposals for treatment solutions to supplement catchment management measures will be considered as part of the optioneering exercise, but will need to be justified in full for each individual supply system.

4.5.6 The Inspectorate will assess all proposals with a view to ensuring that the existing Undertakings remain fit for purpose, and will seek to have completed processes for accepting all revised Undertakings by April 2018. In its assessments, the Inspectorate will challenge companies to deliver the improvements to the best practicable timescale for consumers. In doing so, the Inspectorate will have regard to the scale of the work involved for companies in delivery of this task, including in many cases the scaling up of pilot studies

to full catchment areas. Consequently, the Inspectorate is minded to consider extending the duration permitted for delivery of programmes of work beyond the current completion date of 2020, subject to acceptance of the justification of the need to do so as proposed by the company.

4.5.7 The Inspectorate recognises that these programmes of work will require a significant scaling up of current arrangements for engagement between stakeholders and it is committed to facilitating these activities. We believe this collaborative and measured approach builds consistently on current arrangements and activities, and will continue to deliver the outcomes that consumers expect at a cost that is manageable. However, if voluntary catchment management initiatives do not bring forward the improvements required, the Inspectorate will advise Ministers on the other options available to them to protect consumers, including the consideration of further targeted regulatory actions.

4.5.8 The Inspectorate also recognises the challenges that pesticides contamination brings to other areas of companies' activities, in particular, abstraction management; water resource planning; and building resilience capacity. However, these constraints will continue to apply until the risks to consumers from non-compliance with pesticides standards are mitigated satisfactorily.

#### 4.6 Water treatment

4.6.1 The Inspectorate expects water companies to use treatment processes to make water safe and clean, with the aim of proactively mitigating risks to public health, and to the wholesomeness and acceptability of supplies. The processes used should be consistent with the actual and potential hazards to be mitigated. However, it is essential to the consistent everyday delivery of adequate treatment that treatment facilities operators are aware of any pollution challenges in the catchment which may affect the quality of raw water. This will enable them to maintain the stability and optimisation of treatment conditions. An integrated view of risk management across catchment, abstraction, storage and treatment best secures continuous adequate treatment of water and levels of service to consumers.

4.6.2 It is also expected that treatment facilities will have the operational flexibility over short-, medium- and long-term timescales to support resilience, including suitable monitoring and fail-safe arrangements that make provision for containment and/or flow diversion, to prevent the supply of inadequately treated water to consumers.

4.6.3 Treatment processes and controls should be reviewed in detail to check for hazards as part of a company's risk assessment process. This applies especially to the integration of new or replacement processes and equipment that should be subject to rigorous integration testing, with supplier support and operator training. There is ample evidence from event records to illustrate the unnecessary impact on consumers from relatively minor operational interruptions. Companies are reminded that it is a criminal offence to supply water that is not treated adequately, as required by the Regulations. The Inspectorate expects to see a significant improvement in the operational performance of treatment facilities, aided by consistent application of good practice in maintenance of assets, in particular, for dosing systems and monitoring and control systems, where proactive preventative replacement strategies and/or fail-safe back-up facilities are expected as a minimum requirement. Robust

processes for specification and use of controlled substances and products, together with management of the delivery and use of treatment chemicals, are essential.

4.6.4 The integration of risk management mentioned previously also extends to the supply side of treatment facilities. All decisions made by supply controllers or network operators on supply provision should consider implications for the quality of the supply. These considerations should include, as a minimum, the control measures necessary to mitigate any impact on the stability and optimisation of pH, colour, and phosphoric acid dosing for plumbosolvency control; on disinfection and control of disinfection by-products; and on fluoridation; and on the acceptability of the supply to consumers, including taste and odour, and discolouration. Companies must ensure that operator training is comprehensive and relevant to all processes in the supply chain in this regard.

4.6.5 Water treatment is an evolving discipline, and the Inspectorate is currently in discussions with companies about arrangements to further develop the reliability and use of on-line monitoring systems to improve responsiveness and support use of improved digital monitors and controls.

#### 4.7 Water distribution

4.7.1 It is currently the case that distribution issues contribute to one third of notifiable drinking water quality events every year, with a quarter of these of a duration greater than 48 hours, and with an impact on, typically, some 2 million consumers. A notable minority of these events are caused or exacerbated by company staff. This suggests that the resilience of distribution service delivery needs to improve substantially to reduce the impact on consumers, and that current operational practice may pose a risk to wholesomeness of supplies in some circumstances.

4.7.2 In the Chief Inspector's Report: Drinking Water 2014, the Inspectorate asked companies to review their consumer contact data on a continuous basis to identify supply zones with persistent problems. Analysis by the Inspectorate subsequently identified areas of concern where the level of consumer contacts for discoloured supplies had been above the industry average for the preceding three years. This led to the Inspectorate putting legal instruments in place to require companies to improve performance. The improvements included treatment works upgrades; reservoir cleaning; and operational measures within zones such as flushing.

4.7.3 This action is indicative of our commitment to ensuring companies reduce the level and frequency of discolouration complaints. The Inspectorate will continue with this policy and extend its reach to all companies where there is evidence of persistent consumer complaints about the aesthetic quality of the supply. Mitigation actions to reduce such complaints must involve operational planning for strategic and recurring cleaning/maintenance, improved treatment processes and/or permanent solutions to reduce complaints in the long term.

4.7.4 The distribution risk assessments required from all companies should draw on the accumulation of years of quality data; contact data; and asset specific data, including maintenance and repair history. The mitigations arising should form the basis for a proactive maintenance and operation regime. Repeat events at the same assets require an update of

risk assessments, and any resulting mitigations, and may result in enforcement. Use of material and maintenance or renovation histories should enable recognition of any patterns of deterioration that cause quality issues, and contribute to recognition of emerging risks. On a matter of detail, it is not acceptable to routinely and passively accept impacts on the quality of supplies arising from burst mains, in particular, the often associated discolouration that arises from network flow variations caused by such interruptions to supply. Recurring impacts of this type should be considered as risks to wholesomeness, and appropriate mitigation, such as flushing to control deposits or replacement of regularly failing mains put in place.

4.7.5 The Inspectorate welcomes the developments in network management, such as software aids and improved training for operators to provide “calm systems” approaches, and encourage their continuing use as operational tools. However, these do not deal with the underlying root causes of disruptions to consumer service that we expect companies to mitigate. We encourage the use of real-time monitors for routine operational monitoring as investigative tools in providing improved responsiveness to interruptions and more efficient and effective demonstration of benefit in a reduced timescale following improvement works.

#### 4.8 Lead

4.8.1 The standard for lead was reduced from 25ug/l to 10ug/l in December 2013. The point of compliance measurement is the consumer’s tap and action is mandatory in response to every analytical result that exceeds the standard to protect consumers.

4.8.2 Water companies implement risk-based strategies to achieve compliance with the lead standard, and companies are expected to continue to apply this approach to managing compliance with the lead parameter. If there is a risk of exceedances of the 10ug/l standard, depending on circumstances, companies must take steps to maintain wholesomeness by lead pipe replacement/relining or treatment to reduce plumbosolvency. The treatment must be optimised (i.e. optimum dose, with regard to water aggressivity parameters), and networks operated to maintain stability and consistency of blends in supply, for greatest effectiveness at the point of use throughout the distribution system.

4.8.3 Where there is a failure to comply due to a domestic distribution system, a company needs to take mandatory consumer protection measures as required by the Regulations, and in the case of public buildings a company needs to exercise its powers to prevent contamination, if necessary by enforcement under s75 of the Water Industry Act 1991.

4.8.4 The Inspectorate expects water companies to continue to maintain and implement their current strategies for meeting the lead standard. Companies should continue to agree a collective approach with relevant stakeholders such as the local authorities and the local Director of Public Health/Consultant in Communicable Disease Control, and support agreed targeted action with effective communications aimed at vulnerable consumer groups and their advisors or carers.

4.8.5 Companies in Wales need to have regard to the specific requirements of Welsh Government on lead matters in their SPS advice to Ofwat; to deliver the requirements of the Wales Water Strategy; help deliver the goals of the Well-being of Future Generations

(Wales) Act 2015; and to liaise with the Water Health Partnership for Wales on the development of policy in this area.

4.8.6 As part of their lead strategies, companies must keep their risk assessments under constant review, and identify an appropriate integrated package of measures to mitigate any risks identified. In addition to the actions outlined above, this package should include the following measures:

- a. Identification of high, medium and low risk supply zones in terms of consumer exposure to lead in water supplies;
- b. Continuation of, and, if necessary, further enhancement to plumbosolvency control measures;
- c. Replacement of the lead communications pipe where the standard of 10µg/l is not met, and consideration of the benefits of replacement of the consumer service pipe. Replacement of consumers' service pipes alongside replacement of company-owned pipes has been shown to deliver significant benefits (including leakage), but the Inspectorate does not have the statutory power to require companies to include this in their lead strategies - beyond occurrences of metal failures related to communication pipe material. We recognise, however, that some companies have demonstrated the benefits of this approach and include it in their existing lead strategies;
- d. Consideration of the benefits of opportunistic lead communication and service pipe replacement from planned work on the distribution system (e.g. when preparing pipe-work for the installation of meters);
- e. Work with local authorities to identify vulnerable consumers, and to identify appropriate solutions, including the replacement of lead pipes in public buildings (e.g. when refurbishment is carried out in local authority housing);
- f. Work with health protection teams to identify vulnerable consumers and appropriate solutions, in particular, for schools and nurseries;
- g. Have in place a communications and education strategy to make consumers, and other stakeholders, aware of the risk of lead in tap water, what can be done to mitigate the risk, and who has responsibility for lead pipes.

4.8.7 The Inspectorate is aware that some companies are investigating lining techniques for communication pipes and service pipes, and that these techniques may be beneficial when applied to lead pipes by reducing the risk of compliance failures and consumers' exposure to lead. The Inspectorate supports the inclusion of such trials in lead strategies.

#### 4.9 Other point of use considerations

4.9.1 In addition to lead, other impacts on wholesomeness, for example, copper and nickel, can relate to the effects of consumers' plumbing on the quality of water supplied, and the Regulations require water companies to condition their supplies to mitigate such risks to water quality beyond the mains network. Guidance on potential approaches for investigations into copper and nickel failures is available on the Inspectorate's website [here](#) .

4.9.2 The Inspectorate expects companies to continue to enforce the Water Supply (Water Fittings) Regulations 1999 to protect wholesomeness and consumers. It is good practice for every company to have an overarching strategy that includes their lead strategy, and collaborating with other stakeholders, to identify these hazards and mitigate their risks as far as possible. This may mean removal of hazards (for example, lead communication and supply pipes; lead soldered pipe joints); provision of advice to consumers (for example, flushing; Water Fittings Regulations inspections); and training of relevant stakeholders (for example, plumbers; housing associations) to ensure that water quality is maintained at the consumer's tap.

4.9.3 When a failure is caused by a private domestic system, and is indicative of a significant risk to health, companies should seek to ensure that the defect is corrected, if necessary using their powers to prevent contamination under section 75(2) of the Act.

4.9.4 In public buildings, companies must consider whether the problem can be adequately addressed through advice to the building occupier or owner, or if action is required by them or the building owner under sections 74 and/or 75 of the Act, if necessary using their powers of enforcement provided by the Act.

4.9.5 There is currently work underway by Welsh Government, the Inspectorate and companies to review options for the long-term management of lead issues.

#### 4.10 Radioactivity

4.10.1 Regulations require water companies to continue to monitor for radioactivity parameters.

4.10.2 Under recent changes to legislation, there is provision for exemption from monitoring for radioactivity parameters, and guidance on the process for these exemptions is included in guidance [here](#).

4.10.3 Companies are not expected to provide monitoring data for surface water supplies and groundwaters in low risk radon hazard areas, but should still confirm in their reports that a risk assessment has been carried out and that there is a low risk of radon being detected with activity levels above 100Bq/l. Companies should demonstrate that the risk for the site has been adequately assessed and these sites will require a Radioactivity Notice to vary compliance monitoring frequencies. During the period the Notice is in effect, we recommend that companies carry out an operational monitoring programme to demonstrate that there has been no significant change to the circumstances relating to the issue of the Notice.

4.10.4 Gross alpha and gross beta remain the indicators for the measurement of indicative dose. Investigations into breaches of either gross alpha or gross beta should trigger a re-evaluation of the indicative dose calculation if there have been significant changes in the normal measured values.

4.10.5 Tritium remains the indicator parameter for man-made radioactive parameters and an exceedance in this parameter should trigger an investigation into man-made radionuclides.

4.10.6 Radon has been introduced into the Regulations as a new parameter; current information suggests that this is unlikely to be of concern in public supplies.

#### 4.11 Other enduring or emerging risks

4.11.1 We would draw companies' attention to some enduring or emerging risks for drinking water quality at a limited number of sites that may require provisions within risk assessment reports. Additionally there are evident weather-related risks for turbidity issues and associated tastes and odours caused by MIB and geosmin.

4.11.2 The compliance standard for nitrate remains at 50mg/l. Any increasing trend of nitrate concentrations in groundwater should be accompanied by catchment control under the EC Nitrates Directive, in the first instance, and treatment solutions should to be considered as a last resort, supported by written confirmation from the environmental regulator that potential catchment management solutions are exhausted.

4.11.3 Based on recent research on chromium VI, and advice that exposure should be as low as reasonably practical, the Inspectorate has provided advice on the need for action to protect consumers [here](#). Companies are reminded to review their circumstances and to put in place measures to mitigate levels that occur above 3µg/l.

4.11.4 MIB and geosmin levels in raw water at some sites can cause taste and odour issues in supply. Risks to the quality of water supplies presented by such parameters are generally well understood by companies and mitigation measures should be included in risk assessments.

### **5. Supporting development of business plans for periodic reviews**

#### 5.1. Context

5.1.1 The Inspectorate's strategic objectives are that water suppliers provide drinking water to consumers that is safe and clean, and that the public have confidence in their water supply.

5.1.2 In addition, Ministerial guidance from both the Welsh Government and UK Government will be provided to Ofwat on Governments' strategic priorities and objectives. We understand that these documents will be published during Autumn 2017.

5.1.3 We also understand from consultations by both Governments that Ministers are likely to expect the water industry to, in relation to the quality of drinking water supplies:

- a. Plan for affordable bills, and protect vulnerable customers, by selecting options with a view to delivering the best value for money over the long term, considering the wider costs and benefits to the economy, society and the environment;
- b. Secure resilience of supplies in delivery of their duties, now and in the future; and
- c. Where residual risks remain to long term resilience, companies should describe these transparently and ensure that plans for their mitigation are acceptable to current and future customers.

5.1.4 These points are wholly consistent with the Inspectorate's long term planning guidance. However, we will review and update as necessary this Guidance Note when the

Ministerial Guidance is published, to ensure that the content is aligned with Ministerial objectives.

5.1.5 The Inspectorate's Compliance Risk Index (CRI) is included in Ofwat's list of 14 mandatory performance commitments (PCs) as published in their draft PR19 methodology statement. The Inspectorate is in discussions with Ofwat about the details of how CRI might be used most effectively and fairly going forward. Customer complaints are not included in the list of PCs but companies should be aware that the Inspectorate will still be collecting customer complaint data and may look for improved performance as explained in para 4.7 above.

5.1.6 The Inspectorate is also developing an Event Risk Index (ERI) along similar lines. This index may also be incorporated into the company performance measurement regime for PR19.

## 5.2 Routine arrangements

5.2.1 The requirements of primary legislation and the Regulations relating to drinking water quality are routinely discharged by water companies, and overseen by the Inspectorate. However, periodic reviews provide companies with an opportunity to review their arrangements, and, in particular, enable companies to revisit and update in their revised business plans as necessary, their long term planning requirements for the supply of drinking water.

5.2.2 The core framework for drinking water quality reviews is already in place in the form of risk assessments based on a company's water safety planning processes, which are used to inform risk assessment reports to the Inspectorate. Outputs from these processes continuously inform the risk management arrangements of the company for each of its water treatment works and supply systems, both upstream and downstream. These risk assessments identify all the relevant hazards in the catchment; in the water treatment works; in distribution systems; at the point of use; and in a company's operations and maintenance arrangements that could potentially impact on a company's ability to supply wholesome drinking water. Wholesomeness is defined in the Regulations by reference to drinking water quality standards and any other substance or organism alone or in combination with another substance that would constitute a potential danger to human health and acceptability to consumers. The minimum statutory requirement is 100% compliance with these standards.

5.2.3 The risk assessments should already consider the short, medium and long term control mechanisms required to address each hazard and assess whether there is a need for additional control measures in the catchment, at abstraction points, at the treatment works or in the associated supply system to secure that drinking water is wholesome at the consumers' taps and risks to human health are appropriately mitigated. These measures may need investment in existing assets or in maintaining existing control measures already in place, where these are deficient. It should be recognised that many risks may be managed already through operational and/or communications control measures, and the case for investment may relate to improving the performance, reliability, resilience, and/or sustainability of such controls.

5.2.4. Our approach provides flexibility for companies in the development of solutions to deliver required outcomes and encourages innovation by companies by recognising, and making provision for, uncertainty in outcome delivery and in the duration of scheme delivery

of the solutions adopted. This is especially relevant for catchment management schemes, for new technology, and for innovative solutions. In agreeing to such proposals for outcome delivery, the Inspectorate will need a clear understanding of the company's provisions for all aspects of outcome delivery recovery, if needed. Where legal instruments are put in place, mitigation steps may include investigative or modelling actions to facilitate identification or confirmation of the optimum solution.

5.2.5 The change application process that is already in place will continue to be applied for revisions to agreed proposals, where applicable. This enables companies to propose alternative solutions where these have been identified and can be shown to deliver benefits over and above the original proposal, or because changed circumstances require an alternative solution. This change application process is intended for genuine unforeseen circumstances and will only be granted if deemed appropriate by the Inspectorate. In all circumstances, prompt communication with the Inspectorate is encouraged as soon as any delays are foreseen. No alternative solutions will be permitted if they are not formally accepted by the Inspectorate prior to implementation through the change application process.

### 5.3 Accommodating business plan reviews

5.3.1 In support of routine processes, the Inspectorate is content to consider any new or revised requirements for improvements for drinking water quality reasons that might arise from a company's review of its current risk assessments as part of its business planning process. The outcomes from risk assessments referred to above should provide the supporting information for any drinking water quality proposals to achieve identified outcomes that water companies wish to include in their business plans. Any such proposals will be scrutinised for justification of need, in accordance with our usual procedures. If proposals for control measures are supported, they will be incorporated into legal instruments that specify the solutions and timescales to be delivered, together with arrangements for monitoring progress and confirming completion and outcome delivery.

5.3.2 Although current periodic reviews span just a five year period, the Inspectorate expects that companies will need to take clear strategic long term views on their planning needs to ensure that their risk management strategies are coherent, effective, efficient and sustainable.

5.3.3 To provide assurance that risk assessments include a long term view, the Inspectorate requires all water companies to prepare and submit to the Inspectorate, by the end of May 2018, a concise statement that sets out significant new future risk mitigation measures that a company considers it will need to provide for. New measures are those that are beyond routine provisions for current risk mitigation for all of a company's supplies from source to tap, insofar as they affect the quality of drinking water supplies. Items of relevance might include, but not be confined to, significant costs for the sustainability of long term catchment management provisions; one-off, or "lumpy", existing asset replacement for water treatment or storage facilities; additional risk mitigation at water treatment works; and activities on the supply network that might include maintenance of trunk mains; dealing with discolouration; material or condition driven activity (for example, on epoxy resin lined pipework, asbestos cement mains, and lead pipe connections); and network resilience

measures. The Inspectorate is sympathetic to concerns of companies that this is a significant task, and would emphasise that this submission is envisaged to be a concise summary. However, the Inspectorate intends to return to this subject during 2020 with a view to undertaking a more substantial engagement with companies to improve the level of detail and quality of information.

5.3.4 For consistency and comparison, requirements should be considered from 1<sup>st</sup> April 2020, for a duration of a minimum of 25 years or more. Duration will vary with driver – for example, where applicable, consideration of alternatives to plumbosolvency measures for lead pipework should assume a duration of up to 50 years to minimise affordability issues. Contributions to delivery within the AMP7 period should be clearly identified. The statement should state the item for which provision is required; its location or scale; the planned timing and duration of action by the company; and an estimate of the total and annual costs involved.

5.3.5 Transparency about, and availability of, this information is required by the Inspectorate to inform its discussions with each company, and its Customer Challenge Group (CCG), on the adequacy of its planning for future requirements to maintain the quality of drinking water supplies to consumers. Additionally, for Welsh companies, the information will be relevant to demonstrating that both Ministerial priorities and strategic objectives and the requirements of the Wellbeing and Future Generations Act 2015 are met. For English companies, the information is relevant for demonstrating alignment with Ministerial priorities and strategic objectives on transparency in long term planning and intergenerational fairness.

#### 5.4 Evidence to justify need

5.4.1 Water companies seeking technical support for new improvement schemes from the Inspectorate will need to demonstrate the need for each proposal. The case for justification of need must be accompanied by the evidential information which justifies the need for action, and demonstration that the risk is significant enough to take action at this time, including:

- a. how the company has derived the most appropriate technical and cost effective options to mitigate each named hazard and thereby achieve compliance with the regulatory requirements;
- b. summary details of the capital costs and the net additional operating costs, as part of the overall total expenditure (totex), of each of the options considered;
- c. identification of the preferred option and the rationale for choosing that option and reasons for discounting all other possible options and
- d. evidence that the preferred option will adequately mitigate the risk and deliver the required outcome within an appropriate timescale, and that the solution is sustainable, and improves resilience.

5.4.2 The Inspectorate will expect companies to provide detailed supporting evidence that the preferred option will mitigate the risk of the hazard occurring or, where the hazard already exists, reduce the risk to an acceptable level (i.e. compliance with any relevant standard or guideline value for unlisted parameters) within a prescribed timescale. The

Inspectorate will not consider submissions for individual schemes that are not accompanied by supporting evidence of the process employed by the company to assess and determine the most appropriate technical and cost effective solutions, and specific supporting evidence of the appropriateness of the preferred option.

5.4.3 Companies' analyses should include an assessment of all relevant benefits including the benefits of provision for protection of public health, and maintenance of public confidence in drinking water supplies. These benefits should be assessed qualitatively, quantitatively and where possible, monetised, in order to demonstrate that the proposed solution is needed, has a clear driver, will deliver the required outcome within the prescribed timescale, is sustainable in the long-term and is cost-effective. We note that Ofwat, in its customer engagement policy statement for PR19, is encouraging companies to use a robust, balanced and proportionate evidence base to understand benefits to customers. We will seek confirmation from companies that proposals are consistent with their long-term strategies for delivering water supply outcomes, and that these outcomes are consistent with their customer and stakeholder research.

5.4.4 Companies should ensure that they review their compliance returns, event assessment letters, audit letters and commentaries in the Chief Inspector's reports to ensure that issues are addressed. The Inspectorate will make use of information available to it from compliance assessments, event assessments, consumer complaints and operational audits to be assured that companies are investing in areas where there is evidence of need.

5.4.5 The information requirements to support and justify preliminary submissions for individual proposals to the Inspectorate are provided in the attached Annex A. Submissions that are not accompanied with an up to date risk assessment report and comprehensive supporting information as detailed in the Annex A will be rejected. Submissions should be sent electronically to the Inspectorate's Price Review mailbox: [dwipricereview@defra.gsi.gov.uk](mailto:dwipricereview@defra.gsi.gov.uk), according to the timescales explained in para 5.7 below.

## 5.5 Decision letters and legal instruments

5.5.1 The Inspectorate will formally confirm or decline to support the proposal in a Final Decision Letter sent to a company's board level contact, copied to the day-to-day contact and the Chair of its CCG. The Letter will also indicate whether or not a legal instrument will be put in place to implement a statutory programme of work.

5.5.2 We anticipate that some proposals, in particular catchment schemes, may be submitted for regulatory support which will deliver longer-term improvements to raw water quality, but are not included by the Inspectorate in a specific drinking water quality scheme, or are not included in the environmental regulators' programmes of work. In these cases the making of a legal instrument for drinking water quality is unlikely to be appropriate, but the proposal may be commended by the Inspectorate in the Final Decision Letter, which will also confirm that a legal instrument will not be put in place.

5.5.3 The transposition of supported proposals into formal programmes of work will reflect the regulatory position as set out in the Regulations and the relevant sections of the Act. Where there is evidence of current, or a likelihood of future, failures of a standard for a parameter linked to a hazard identified through the risk assessments, the Inspectorate will

put in place Notices confirming the statutory requirements. As is already the case, all legal instruments will continue to include a demonstration of benefits stage to provide evidence to the Inspectorate that the required outcome has been achieved following completion of the programme of work. Companies may wish to ensure that their procurement arrangements are consistent with this requirement. We will arrange meetings with companies to discuss proposals where additional actions are necessary, and also to discuss companies' proposals for maintaining and operating their water supply assets to prevent future non-compliance.

## 5.6 Engagement

5.6.1 For the periodic review process, Ofwat has asked water companies to establish Customer Challenge Groups, chaired by an independent person. The role of CCGs is to provide independent challenge to companies and provide independent assurance on: the quality of a company's customer engagement; and the degree to which this is reflected in its business plans. The Inspectorate is not a member of the CCGs, but will be involved as required to support the process, including through contributing to Ofwat's regular meetings with the CCG chairs when appropriate. Consumer research consistently shows that consumers value and prioritise a safe, reliable supply of water that is wholesome. We have written to companies and CCGs setting out our position.

5.6.2 We will discuss with companies and CCGs, as required, any other issues that may affect the quality of drinking water quality supplies. In particular, companies should be able to demonstrate to the Inspectorate and CCGs that their business plans include sufficient provision for operations and maintenance activities to ensure that compliance with the Act and the Regulations is maintained; that the quality of drinking water does not deteriorate; and, where it is deficient, it is improved. Companies are also expected to consider more generic risks to resilience, for example, power outages, flooding, drought, security of supply for treatment chemicals, analytical capacity, and system issues such as critical telemetry, SCADA and other IT systems.

5.6.3 The Inspectorate expects companies to have a sustainable and integrated asset management strategy for all water supply assets that is designed to minimise the risk to consumers by proactive mitigation of the risks of drinking water quality events and non-compliance with the standards. This reflects the general duties of water companies to maintain an efficient and economical system of water supply. Risk-based asset maintenance strategies are regarded by the Inspectorate as an integral part of companies' risk assessment and risk management approaches using water safety plan methodology.

5.6.4 Asset maintenance strategies that prevent problems with drinking water quality by proactive intervention should be applied to all water treatment and distribution assets, in particular treatment works and service reservoirs. If a company does not have an adequate asset management strategy in place, then there will be a risk of future non-compliance with the statutory water quality standards and a greater likelihood of a deterioration in the aesthetic quality of drinking water as measured by consumer contacts reporting discolouration or an objectionable taste or odour.

5.6.5 Water asset management strategies must be informed by a comprehensive review of information about recent water quality incidents, breaches of standards and the number of

consumer complaints because these data may be the only reliable evidence that points to systemic and persistent underperformance of existing assets.

#### 5.7 Timeline for PR19 engagement

5.7.1 The Inspectorate's timetable for PR19 has been developed to assist companies that have told us that they are planning to prepare a draft business plan by September 2018. We would encourage companies to submit business plan proposals for drinking water quality as early as possible.

5.7.2 We will accept submissions up to the end of December 2017, with a view to Final Decision Letters being issued by 30 May 2018. All submissions must be accompanied by up-to-date risk assessment reports. If the risk assessment report is a revised version with different risks to the version previously submitted, it would be helpful if these could be sent at least four weeks in advance of the PR19 submission, with changes clearly highlighted, to allow the Inspectorate time to review the revised risk assessment and to consider whether enforcement action may be appropriate.

5.7.3 We have set a target date of the end of December 2018 to have all necessary legal instruments in place to allow time, if required, for CCG consultations before Ofwat's final determinations at the end of 2019.

## Annex: Proposals to carry out improvements for drinking water quality reasons – submission of information

### **An up to date regulation 28 risk assessment report must be appended with all submissions.**

This annex lists all of the information that companies should provide to the Inspectorate with PR19 proposals for drinking water quality. If the information is already included in the regulation 28 reports submitted with proposals, or in other documents appended to the submission, there is no need for companies to provide the information again separately.

#### ***Scheme details***

<b>Water Company:</b>	
<b>Date of submission</b>	
<b>Name of supply system &amp; Reg. 28 Report ref. number:</b>	
<b>Name of Water Treatment Works/Distribution System/Service Reservoir/Other asset</b>	
<b>Water quality hazard/drivers identified:</b>	
<b>Reference to outcome in company's long-term strategy</b>	
<b>Stage One – Details of water treatment works and associated supply system</b>	
<b>Provide supply arrangements and treatment works details:</b>	
A description and diagram of the supply system related to the treatment works [In many cases, companies include this information, including schematic diagrams, in regulation 28 risk assessment reports, in which case it is acceptable to refer here to the report, which should be appended]	
Design capacity MI/d	
Volume supplied: Daily average and daily maximum MI/d [Please include a commentary if there are any constraints on deployable output due to limitations associated with any part of the treatment process]	
Sources of raw water, continuous, seasonal or standby [Include names of individual sources, nature of the source (e.g. surface direct abstraction; surface impounding reservoir; borehole; spring; type of aquifer)]	
Treatment processes currently employed (including pre-treatment of raw waters) [In this case, blending is defined as treatment. This includes blending of raw waters prior to treatment. Please also indicate if bankside storage of raw water is utilised, and average retention time in the reservoir]	
Service reservoirs/booster pump details	
Water supply zones supplied [If the supply is blended with waters from other treatment works in the zone, please indicate the relative proportions (as %)]	
Population of each water supply zone supplied	
<b>Stage Two – Hazard identification and Risk Characterisation</b>	
<b>Provide details of methodology used to identify hazard i.e. historic data, events/incidents including near miss situations, operator knowledge, modelling and site visits/technical audits</b>	
Summary of historical data on the values and concentrations of the organism, substance(s) or parameter(s) associated with the hazard in the raw water source and the water entering supply from the relevant treatment works from compliance,	

investigative, or operational sampling
Details of any existing contraventions of regulatory requirements and whether they are likely to recur (at WTW, SR and/or at consumers taps)
If evidence of likely to contravene any regulatory requirement, details of when this is likely to occur (at WTW, SR and/or at consumers taps) including trend analysis & prediction modelling
Details of any other data relevant to the hazard identified
If appropriate, summary of data/information on consumer complaints
Details of any events that have occurred in catchment, at treatment works and in supply that are associated with hazard identified
Details of any existing control measures that might influence the values and concentrations of the organism, substance(s) or parameter(s) associated with the hazard in catchment, treatment and in supply
Details of monitoring of the control measure (including validation monitoring)
Details of any changes in practices or policy which might have influenced the values and concentrations of the organism, substance(s) or parameter(s) associated with the hazard in water supplied to consumers, i.e. in relation to resources, blending arrangements, treatment or supply arrangements and the dates of those changes
Details of any licensed abstraction issues which might influence the values and concentrations of the organism, substance(s) or parameter(s) associated with the hazard in raw water
Reasons for the presence of the hazard, if known, otherwise details of what is being done to identify source of hazard
<b>Outline Risk characterisation i.e.</b>
Details and score arising from consequence v likelihood matrix,
Where score sits in risk profile for supply system
<b>Stage 3 – Control Measures Required</b>
<b>Provide details of short, medium and long terms control measures i.e.</b>
Details of short term actions currently in place to mitigate against risk & their effect
Details of mid to long term control measures identified for any residual risk:
(i) Options the company has considered which should, where appropriate, include catchment management controls; or communications controls in association with other stakeholders
(ii) Timescale for delivery of each option
(iii) Capital costs and net additional operating costs of each option considered
(iv) Summary of costs and benefits of each option
(v) Reasons for choosing the preferred option
(vi) Specific supporting evidence that the preferred option will address risk of hazard within the required timescale
Full details of how the company intends to assess and measure the benefits delivered (the outcome), including details of proposed sampling programme, number of samples to be taken over the specified period and parameters to be monitored.