Drinking water 2014

Private water supplies in England

July 2015

A report by the Chief Inspector of Drinking Water

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Chapter 1:

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- Indicates the extent to which local authorities are exercising powers to improve failing private supplies.
- Records the Inspectorate's support of local authorities in answering enquiries and providing technical advice.

Drinking water 2014 is the annual publication of the Chief Inspector of Drinking Water for England and Wales. It is the 25th report of the work of the Inspectorate and presents information about drinking water quality for the calendar year of 2014. It is published as series of seven reports, five of which cover public water supplies and two describe private water supplies. This report is about private supplies in England.

This report describes the key facts about private supplies in England. This report is the fifth of its type and presents information based on the updated private supply records provided to the Inspectorate by local authorities in January 2015. Due to the geographical dispersion of private supplies across the country, the information in this report is generally presented by grouping local authority information into nine geographical regions as illustrated in Figure 1. The more detailed information about private supplies in each individual local authority area can be found in *Annex 1*.

Figure 1: Reporting regions

In 2014, local authority records contained the details of a total of 37,717 private supplies in England, 67% of which serve a single household. Over half a million (567,261) people in England live or work in a premises that relies on a private supply and a further 1.4 million people will attend festivals, shows and other events served by such supplies. Whereas the quality of public water supplies in England in 2014 was very high, with only 0.05% of tests failing to meet the European Union (EU) and national standards, the quality of private water supplies remains a concern, with 6% of tests failing to meet the standards in 2014. Nonetheless, this figure represents an improvement when compared to the 9.6% of tests that failed in 2010, the year when reporting for private supplies was first introduced.

The results of testing during 2014 demonstrate that private supplies in England and Wales continue to be of unsafe microbiological quality, with 12.8% of samples containing *E.coli* and 13.4% containing Enterococci. Failures of these two standards mean that the water supply is contaminated with faecal matter and there is a risk that harmful pathogens

will also be present. More detailed information about private supply test results can be found in *Chapter 4* and *Annex 2. Chapter 4* also summarises the Inspectorate's findings from preliminary checks carried out during 2014 to establish whether the monitoring carried out by local authorities complied with the minimum sampling frequencies set out in the regulations. The main reason for sampling shortfalls was inaccurate private supply volume information and a public building case study is provided in this chapter for learning purposes.

Local authorities were given five years to implement the regulations and during 2014 local authorities completed the outstanding work of classifying private supplies. For the first time, therefore, Chapter 2 of this report contains complete information about the different types of private supplies throughout England and Wales. Unfortunately, one local authority in England (Breckland District Council) has failed to comply with Regulation 13 by not providing a valid annual return to the Inspectorate in 2013 and again in 2014, so the figures in this report for that local authority reflect those reported to the Inspectorate in 2012. Similarly, 2014 returns were received from two other English local authorities too late for the most up-to-date figures to be included in this report. No similar problems were experienced for local authorities in Wales.

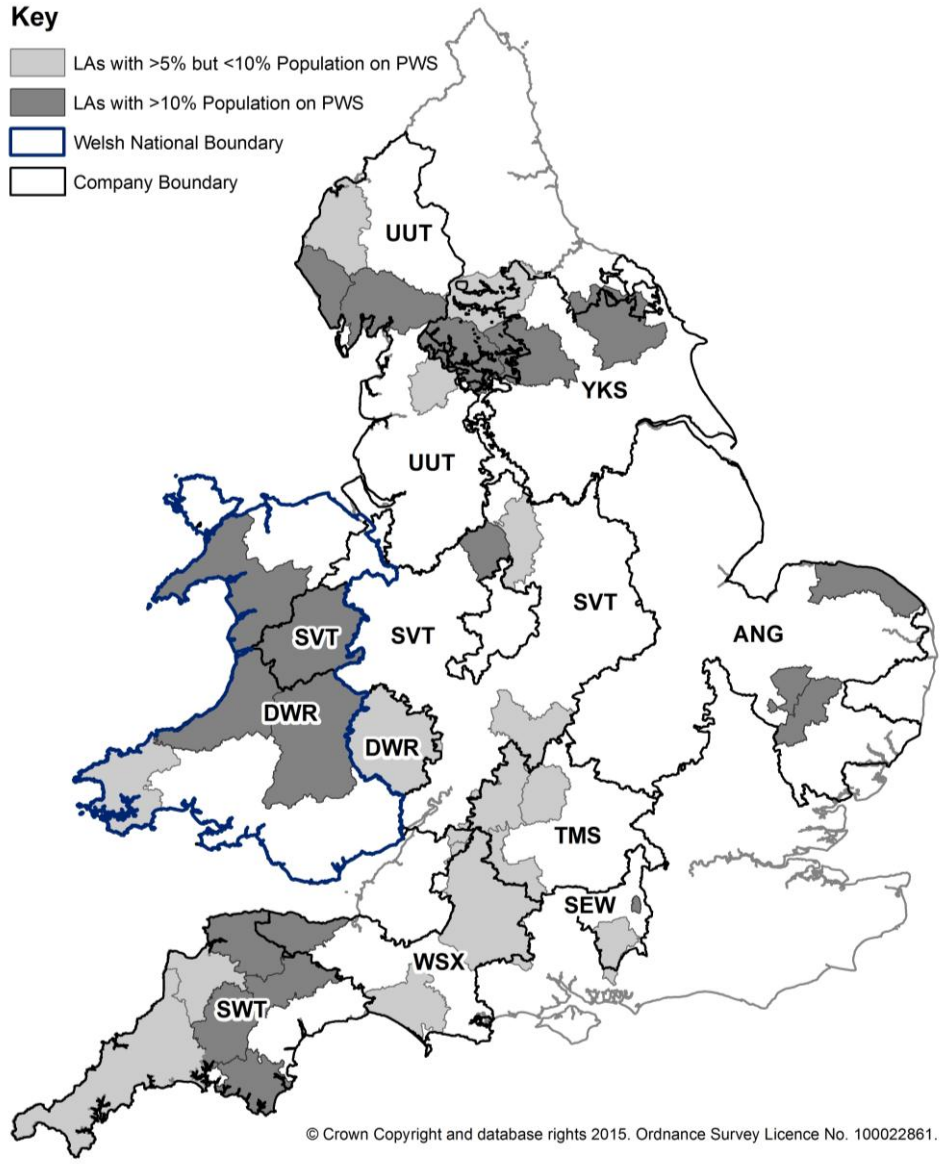
The records show that in 2014 there were 491 private supplies (326 in England 165 in Wales) that were a potential danger to human health where local authorities had to require the owners to make improvements and take steps to protect public health. This represents an increase in risk management activity overall compared to 2013, when action to safeguard public health was taken in relation to 478 private supplies (386 in England 92 in Wales). In England more than half (57%) of these failing private supplies are ones used in the provision of services to the public. The remainder were mostly small, shared domestic supplies (36%). More information about failing private water supplies can be found in *Chapter 3* together with 14 new case studies with learning points.

Chapter 3 also summarises the progress that local authorities have made towards compliance with Regulation 6 (duty to carry out a risk assessment within five years of each private supply other than a supply to a single dwelling not used for any commercial activity and not a public building). Across England and Wales as a whole, the number of private supplies that had been risk assessed after four years was 8,548 (6,718 in England, 1,830 in Wales) covering close to two-thirds (60%) of all relevant private supplies. This compares favourably to the situation published in *Drinking water 2013* where it was reported that only around one-third (32%) of relevant private supplies had been risk assessed after four years. The shortfall is more pronounced in England where 45% of relevant supplies have not been risk assessed after five years, compared to a smaller

shortfall (15%) in Wales. A detailed breakdown of performance on risk assessment at local authority level is provided in *Annex 1*. Overall, this information shows that 156 local authorities (13 in Wales) achieved 100% compliance with the duty to risk assess all Regulation 9 supplies and 128 local authorities (10 in Wales) have fully complied with the duty to risk assess all relevant supplies in their area. In summary, therefore, the greatest deficit (52%) in risk assessment relates to small, shared domestic supplies (known as Regulation 10 supplies). The problem is most pronounced in England where 57% of these small, shared domestic supplies have not been risk assessed compared to a figure of 17% in Wales.

During 2014, the Inspectorate continued its advisory service to local authorities and private supply owners or users who make contact with an inspector through the Inspectorate's website or public phone enquiry line. During 2014 inspectors handled an unprecedented 495 contacts (compared to 142 in 2013) and details about the use of the enquiry service in England since 2008 can be found in *Annex 4*. During 2014 there has been a rise in the number of contacts from private supply owners or their legal representatives (43 compared to 11 in 2013) and from this the Inspectorate has become aware of an emerging issue with a number of community private supplies that have been identified as no longer sustainable. In Chapter 2, the Inspectorate sets out the policy background that has led to the situation that prevails today whereby more than 5% of the population resident in 32 local authorities (4 in Wales) do not have access to a mains water supply. Figure 2, which draws on the individual local authority figures published in *Annex 1* reveals where in the country the extent of the lack of access to a mains water supply is such that there is a need for water companies working closely with local authorities to address the question of the sustainability of private supplies in the next water price review.

Figure 2: Local authorities with either between 5 and 10%, or above 10% of their population dependant on a private water supply



Also as part of the advisory service, during 2014, inspectors attended and gave technical presentations at six regional local authority forums and attended ten water company health liaison meetings. They also carried out a further 27 visits to individual local authorities to assist with particular individual supply or regulation issues and audited aspects of the information provided in local authority annual returns. Five training days were also provided to local authorities. For learning purposes, common findings from the audits are contained within the body of this report. During 2014 the Inspectorate has continued to publish topic notes and advice relevant to private water supplies on its website and *Annex 3* lists these publications along with outputs from the Inspectorate's drinking water quality and health research programme.

Chapter 2: Number and nature of private water supplies in England

Chapter 2:

- Provides details of private supply numbers by type and region.
- Summarises numbers of private supplies used in the provision of services to the public.
- Reports on the performance of local authorities in making returns.
- Discusses the provision of piped water supplies to rural communities in the context of the population served by private water supplies.

The regulations classify private water supplies according to their size and usage. These two factors denote their status in relation to the monitoring and reporting requirements of the European Union (EU) Drinking Water Directive. Large supplies, and supplies of any size serving a public building or used in a commercial activity, comprise those that fall in scope of EU monitoring and reporting whereas for small, shared domestic supplies such reporting is voluntary at the present time. Supplies serving only single domestic premises are exempt from monitoring unless the owner requests this. The regulations also recognise another category of private supply, where a person or organisation other than a licensed public water supplier further distributes water that originates from a public supply. These supplies require monitoring as determined by a risk assessment. The tables in this chapter summarise the number and nature of each type of private supply derived from the returns provided by local authorities in January 2015[1]. Anyone wishing to understand these figures in the context of a particular local authority area should refer to *Annex 1*, a look-up table listing the figures and other information by each local authority in England and Wales.

In *Drinking water 2013,* the Inspectorate reported that it had received a return from every local authority enabling, for the first time, a complete national record of private water supplies in England and Wales. However, that report did not contain the most up-to-date information from three local authorities (Breckland District Council, Daventry District Council and Liverpool City Council). This year, the picture is similar because the return from Breckland District Council that was received in January 2015 once

[1] On receipt of returns from local authorities the Inspectorate carries out checks and makes changes where there are obvious errors in relation to the type of supply.

again contained too many errors for it to be used. In addition, two other local authorities (Selby District Council, Stratford District Council) sent in late returns. Therefore, when reading or using the information in this report it is important to realise that the figures for these three local authorities are out of date.

From Table 3 it can be seen that in 2014 there were 73,634 private supplies in the whole of the UK, of which 37,717 were in England. During 2014, local authorities made further improvements to the classification of private supplies in their area increasing the total number of private supplies with details recorded in the national record for England by 3,496, up from the figure of 34,221 reported in *Drinking water 2013*. *It is to be expected that there will be minor year-on-year variations in the number of private supplies in England for operational reasons (new supplies being commissioned and old supplies being abandoned) and the Inspectorate is satisfied that all local authorities have met the basic requirements of Regulation 12 (keeping records) within the period of five years allowed for implementation of the new regulations. The Inspectorate is also satisfied that all but one of the local authorities in England (Breckland District Council) have met the requirements of Regulation 13 (notification of information to the Secretary of State). The Chief Executive of Breckland District Council has been informed by the Chief Inspector of Drinking Water of this conclusion and the need for a remedial action plan to be put in place to address this failure.*

The area of England with the most private supplies (36%) is the South West of England. There are also significant numbers of private supplies in the West Midlands (15%), the North West (15%), Yorkshire and Humberside (12%) and the East of England (9%). Table 3 also illustrates that private supplies can be found anywhere in the country with 13% (4,843) of all private supplies being located in the other regions of England.

Looking at Table 3, and new for this year's report, details have been provided of those private supplies used only for a domestic purpose other than drinking, cooking and personal hygiene (showering and bathing). The main use of these 'non-human consumption' supplies for domestic purposes is toilet flushing, but this category of supply can also include a supply used only for clothes washing (laundry). The separate recording of this type of private supply is necessary because while such supplies are required to be wholesome (Water Industry Act 1991), the current definition of wholesome in the regulations does not apply. The Inspectorate has commenced a study to close this gap in the regulations and this is due for publication in the autumn. Most of these supplies are located in London and the South East of England and involve the use of a borehole supply for

toilet flushing in large office or public buildings, as a water conservation measure.

Table 3: Number of private supplies reported in 2014, by region.

Region	Large supplies and any size supply used in a public building or a commercial activity	Small, shared domestic supplies	Single domestic dwellings	Private distribution systems	Other – non human consumption	Total
East Midlands	169	221	1,033	16		1,439
West Midlands	563	561	4,703	2		5,829
East of England	383	552	2,318	18		3,271
North East England	257	427	678	1		1,363
North West England	973	1,108	3,446	8		5,535
Yorkshire and Humberside	705	1,096	2,704	4		4,509
London and South East	400	357	1,188	20	76	2,041
South West England	2,390	2,152	9,161	26	1	13,730
England total	**5,840**	**6,474**	**25,231**	**95**	**77**	**37,717**
Wales total	**1,110**	**1,035**	**12,242**	**9**		**14,396**
Northern Ireland*						**1,328**
Scotland*						**20,193**

*2013 data from the drinking water regulators for Scotland and Northern Ireland.
Data excludes for local authorities that did not provide a return within the required timeframe (Selby District Council and Stratford-upon-Avon District Council) or whose data could not be loaded due to errors (Breckland District Council).

Table 3 illustrates how two-thirds (67%) of all private supplies in England serve a single domestic dwelling. Apart from recording the location of this type of supply, local authorities are not currently required to risk assess and check the quality unless requested to do so by the owner, or if the supply comes to the attention of environmental health professionals for some other reason, for example, where there is a change of ownership or use, or a complaint about quality or sufficiency. Accordingly, less is known about these supplies and they have been excluded from the other tables in

this chapter describing the characteristics of private supplies. The remaining 12,486 supplies require risk assessment and monitoring because they are either large supplies or supplies of any size used in the provision of services to the public (15%) or small, shared domestic supplies (17%), or piped systems that further distribute mains water (<0.001%). *As a result of local authorities completing outstanding work during 2014, there is no need for figures denoting unclassified supplies in Table x, The improved accuracy of the records has revealed how compared to 2013, there are 2,239 fewer private supplies in England that will require planned regulatory monitoring in the future.*

Table 4 provides more detail about the private supplies in England used to provide water for drinking, cooking and washing as part of a public or commercial activity. In 2014, local authorities reported an additional 579 such supplies (a total of 5,840 compared to 5,261 in 2013). Around two-fifths (42%) of these supplies are used by the tourism and leisure sector (hotels, bed and breakfast accommodation, campsites, and hostels). Of the remainder, more than a quarter serve food premises (27%) and one-fifth supply public buildings (20%). These figures reinforce the important contribution that private supplies make to the economy of England (particularly in the North West and the South West regions, which account for over half (57%) of all the private supplies used in the provision of services to the public). Table 4 also highlights where highly vulnerable individuals are exposed to private supplies, for example, there are private supplies serving 33 hospitals and 50 schools or other educational establishments. The Inspectorate is aware that in many such instances the decision-making behind the use of a private supply by the management of a hospital or school is one of choice, based on operating cost, rather than necessity, as most of these premises also have ready access to a safe public water supply. The nature of these sites means that local authorities are over-reliant on the relevant person to be competent in risk assessment and monitoring, but it is questionable as to whether this is the case in practice[2]. *During 2015, the Inspectorate will be carrying out closer checks on how well the risk assessment and monitoring duties are being met in relation to private supplies serving these types of premises. Meanwhile it is recommended that local authorities ensure Public Health England has been made aware of these situations and that appropriate arrangements for epidemiological surveillance are in place.*

[2] See case studies 2010/07, 2013/02, 2013/03, 2013/12, 2013/20, 2014/09, 2014/11 relating to schools or hospitals and published by the Drinking Water Inspectorate on the website at http://dwi.defra.gov.uk/private-water-supply/Case-studies/index.html

Table 4: Numbers of private water supplies used for commercial and public activity

Region	Educational and training establishments	Hospitals/care facilities	Food premises	B&B/ hotels/camp sites/hostels	Public buildings
East Midlands	4	3	73	75	65
West Midlands	6	5	114	123	104
East of England	7	3	140	128	110
North East England	1	1	76	116	35
North West England	6	3	350	617	193
Yorkshire and Humberside	6	3	216	358	192
London and South East	6	7	153	59	85
South West England	14	8	442	969	387
England total	**50**	**33**	**1,564**	**2,445**	**1,171**
Wales total	**7**	**11**	**225**	**499**	**107**
Some supplies have more than one type of activity.					

In Drinking *water 2013* the Inspectorate carried out a preliminary exercise looking at the communities across the country where there is a relatively high reliance on private water supplies. Now that local authorities have classified all private supplies, this exercise has been repeated using the more accurate information available in the national record. Annex 1 shows the percentage of the resident population served by a private supply in each local authority area. This information reveals that for 28 local authorities in England the figure exceeds 5% of the population and for 15 of these local authorities the figure exceeds 10% of the population. The highest private supply exposure occurs in South West England in the West Somerset District Council area (31.29%), but there are also other areas of high exposure in North England (Craven District Council, 20.55%; Staffordshire Moorlands District Council, 20.95%) and in the East of England (St Edumunsbury Borough Council (22.18%).

Figure 5: Local authorities with greater than 5% or >10% of their population reliant on private water supplies

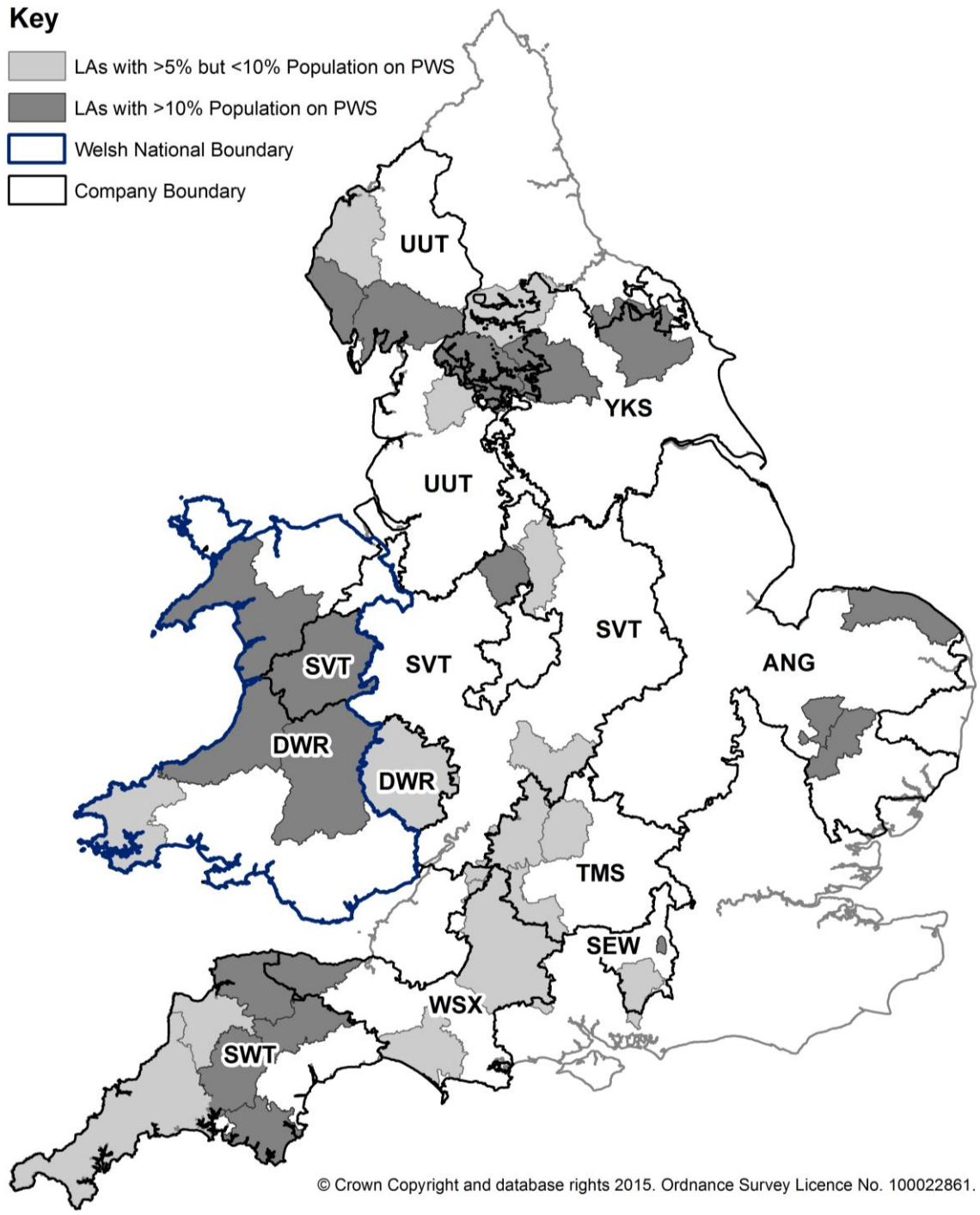


Table 6: Local authorities with over 5% or over 10% of their population being served by a private supply and the water company area they are located in

Water company	Local authority with >5% and <10%	Local authority with >10%
Anglian Water		Forest Heath DC North Norfolk DC St. Edmundsbury BC
Dŵr Cymru Welsh Water	Herefordshire Council Pembrokeshire CC	Ceredigion CC Gwynedd CC Powys CC
South East Water	East Hampshire DC	Rushmoor BC
Severn Trent Water	Staffordshire Moorlands DC	Derbyshire Dales DC Stratford on Avon DC
South West Water	Cornwall Council Torridge DC	Mid Devon DC North Devon DC South Hams DC West Devon BC
Thames Water	Cotswold DC West Oxfordshire DC	
United Utilities	Copeland BC South Lakeland DC	Allerdale BC Ribble Valley BC
Wessex Water	West Dorset DC Wiltshire Council	West Somerset DC
Yorkshire Water	Richmondshire DC	Craven DC Harrogate BC Ryedale DC

The provision of piped water supplies to rural communities.

The direct link between public health and access to an adequate quantity and quality of water for domestic purposes is a long established fact, therefore it is perhaps surprising that hitherto, accurate figures showing the extent of population exposed to private supplies in England and Wales have never been published. In 1944, a national water policy was promulgated for the first time and this recorded how the earlier 1934 Public Health Act had achieved an estimated reduction in the number of persons not served by a piped supply in rural districts to 30% of the population of those districts. This improvement was due to the provision of grants to Rural District Councils to extend piped supplies in rural communities.

The 1944 policy[3] led to the 1945 Water Act which for the first time placed a duty on local authorities to secure the provision of water schemes to bring

[3] A National Water Policy April 1944 Ministry of Health and Ministry of Agriculture and Fisheries HMSO

a piped supply to a point at which a house owner could conveniently connect his own pipe to the main. Alongside this duty, the Act improved the financial arrangements for water supply provision such that the costs could be spread over all ratepayers. Rural District Councils were able to access central government grants to fund water schemes as well as any deficiency in a water undertaker's annual income from its customers until it reached the level of one-eighth of the cost of extending the mains. The aim of these changes was to reduce the scale of the under provision of piped water supplies to 'a very small proportion' relative to the estimated figures published at that time. It was recognised that 'the extension of public mains would inevitably not deal with a certain number of existing remote and isolated houses because the cost of extension would many times exceed the value of the house'. However, a solution to this problem was put in place whereby agricultural grants already available (to support milk production and the development of farming by linking up farms and farm buildings to new mains schemes) were opened up to include farmhouses and isolated cottages.

The Water Act 1945 was supported initially by grants up to a limit of £15m. Additional Acts in 1951, 1955, and 1965 increased this provision so that by the time of the 1971 Rural Water Supplies and Sewerage Act a sum of £115m had been spent since the war on rural water supply provision and the proportion of the rural population with a piped supply had been raised to around 95%. The purpose of the 1971 Water Act[4] was to extend this financial provision by removing the cap on the grant amount in order to deliver the remainder of the schemes necessary to reach what was perceived then to be the realistic extent of piped supply provision in England and Wales (98%). Central government grant provision for bringing mains water to rural communities finally came to an end with the passing of the Water Act 1989. At this time it was estimated that more than 99% of the population was served by a public water supply, the water industry was privatised and the cost of extending piped supplies to rural communities fell within the umbrella of the new regulatory regime, controlled by the industry's economic regulator (Ofwat).

When the new regulatory regime came into force 25 years ago (as set out in the Water Industry Act 1991) the duty on local authorities to secure the provision of piped supplies in rural areas fell away, and in its place local authorities were given powers to improve private water supplies where these were either not sufficient or wholesome. Regulations were made under the Act requiring local authorities to establish records of private

[4] Rural Water Supplies and Sewerage Bill 1971 Second Reading in Parliament 7 July 1971 Hansard

supplies in their area, to monitor the quality of the larger private supplies and provide information to the Secretary of State. For the next 20 years, in the absence of any mandatory duty to act, most local authorities did not exercise these powers and there was little scrutiny by government to ensure accurate records were being kept. As a consequence, health professionals continued to identify outbreaks of water-related illness associated with private supplies and concern has grown about the number of existing rural community supplies that have ceased to be sustainable or have fallen into disrepair[5]. Five years ago, new private supply regulations were made to implement the 1998 EU Drinking Water Directive. The opportunity was taken to introduce a mandatory duty on local authorities to keep records and take action to improve failing private supplies in their area. Also, as a means of identifying problematic supplies, local authorities were required to risk assess all private supplies (other than those serving a single household) and were given five years to complete this work. At the same time, more robust arrangements were put in place for the Inspectorate to supervise the local authorities and to openly report on the status of private supplies.

In summary, while the policy of specific investment in rural water supply provision over a sustained period of 45 years post war has improved household access to a piped water supply, the success of this policy for rural communities was not measured. When responsibility for such investment passed in 1989 from central government and local authorities to the water industry regulated by Ofwat, the situation in rural communities relied on only a general estimate that 98% of the population in England and Wales had affordable access to a piped supply of mains water compared to 70% in 1945. Therefore, in the absence of reliable figures showing the need, the water companies have made no financial provision in their business plans over the last 25 years for investment aimed at addressing insufficiency of access to a safe and reliable water supply in rural communities. Likewise, over this period, Ofwat has not challenged the companies to make such provision. However, the publication of this report by the Inspectorate, containing the figures in Annex 1, Table 6 and evidence from regulatory risk assessments (see Chapter 3), creates a first time opportunity for the water industry to consider whether and how specific provisions for failing or unsustainable rural water supplies could or should be made in the next water price review. *In taking these matters forward with water companies and Ofwat, the Inspectorate will work closely with local authorities to ensure that private supply risk assessment and population information robustly identifies those communities that currently lack access to piped water supplies (or where the existing private supply is*

[5] Drinking water 2010 - Private Water Supplies in England – A report by the Chief Inspector of Drinking Water – published July 2011.DWI

failing) and never benefited from a sustainable government funded rural water supply scheme funded between 1945 and 1989.

Chapter 3: Improving private water supplies

Chapter 3:

- Describes the progress of local authorities in risk assessing private supplies.
- Records the work of local authorities in relation to improving failing water supplies.
- Highlights best practice learning points about risk management through case studies.

From the beginning of 2010, local authorities have been required to carry out a risk assessment of each relevant private supply in their area. This is to determine whether it poses a potential danger to human health and, if so, to take action to safeguard public health in the short term and to improve the supply in the long term. This duty transposes into law, actions required under Articles 3, 7, 8, 9 and 13 of the European Union (EU) Drinking Water Directive to safeguard human health and inform consumers about the quality of their water supply, with details of the nature and timescale of any necessary safeguards and improvements.

3.1 Risk assessments

Local authorities were given five years to identify and risk assess all relevant private supplies in their area (Regulation 6). The methodology of risk assessment is based on the World Health Organisation's (WHO) *Guidelines for Drinking water quality*[6] and *Water Safety Plan Manual*[7] and local authorities have been provided with a risk assessment tool[8] created by the Inspectorate to enable this work to be carried out in a consistent manner across the country. Enquiries about the tool and feedback from its use should be sent to *dwi.enquiries@defra.gsi.gov.uk*

The duty to carry out a risk assessment of every relevant supply is set out in Regulation 6. Table 7 summarises the overall compliance of local authorities with this Regulation at the end of the period of five years

[6] Guidelines for Drinking-water quality 4th Edition WHO, 2011.

[7] Water Safety Plan Manual (WSP manual): Step-by-step risk management for drinking-water suppliers – How to develop and implement a Water Safety Plan – A step-by-step approach using 11 learning modules. WHO 2009.

[8] DWI risk assessment tool is the subject of a non-commercial government licence which prohibits any change or use of the tool for commercial gain.

allowed and detailed information showing the performance of each individual local authority is set out in *Annex 1*.

Table 7: Percentage of supplies with risk assessments

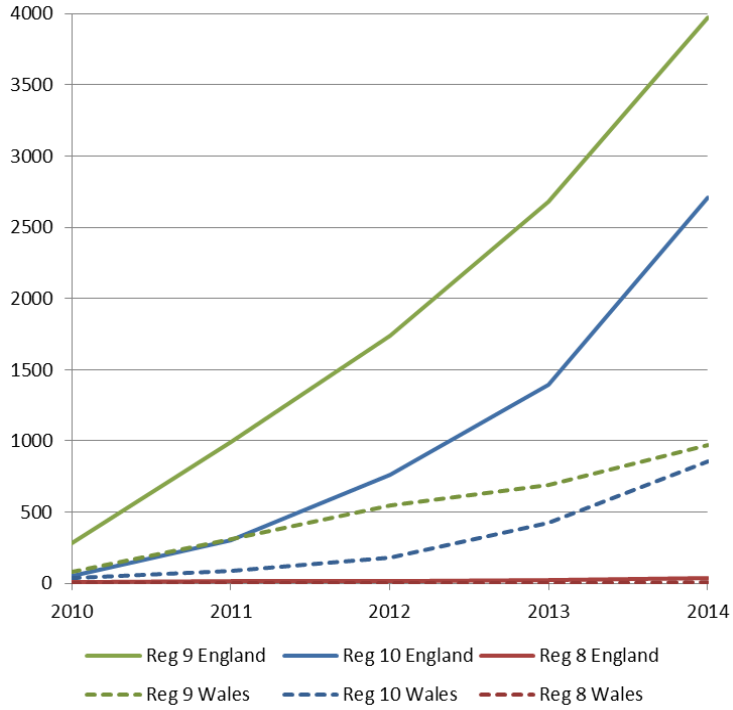
Use of supply*	Percentage of reported supplies risk assessed to date at 31 Dec 2014**	% of risk assessments in place				
		Food premises	Bed and breakfast/hotels	Public buildings	Shared domestic supplies	Total number of risk assessments in place**
East Midlands	61%	87%	80%	87%	47%	247
West Midlands	55%	92%	85%	90%	29%	616
East of England	65%	83%	66%	61%	59%	621
North East England	47%	100%	99%	100%	17%	319
North West England	49%	81%	61%	72%	42%	1,016
Yorkshire and Humberside	67%	95%	97%	96%	49%	1,204
London and South East	88%	95%	95%	95%	83%	681
South West England	47%	68%	51%	96%	37%	2,014
England Total	**55%**	**83%**	**68%**	**87%**	**43%**	**6,718**
Wales Total	**85%**	**89%**	**88%**	**97%**	**83%**	**1,830**
Total	**60%**	**84%**	**71%**	**88%**	**48%**	**8,548**

*****Double counting may occur as some premises have more than one commercial activity.
** Includes All Reg 8, Reg 9 and Reg 10 supplies.

Across England and Wales as a whole, the number of private supplies that had been risk assessed after five years was 8,548 (6,718 in England, 1,830 in Wales) covering close to two-thirds (59%) of all relevant private supplies. While this compares favourably to the situation published in *Drinking water 2013* where it was reported that only around one-third (32%) of relevant private supplies had been risk assessed, it also shows that there is a notable deficit in compliance. The shortfall is more pronounced in England where 45% of relevant supplies had not been risk assessed after five years, compared to a smaller shortfall of 15% in Wales.

Local authorities were advised to prioritise risk assessing those private supplies, which are reportable under the EU Drinking Water Directive and are used in the provision of services to the public (known as Regulation 9 private supplies). From Table 7 it can be seen that this approach has generally been followed across England and Wales with higher compliance figures reported for these types of private supply: public buildings (88%), food premises (84%) and Bed and Breakfast/Hotel establishments (71%). However, in England, local authorities have focused more on food premises (83%) and public buildings (87%) resulting in a relatively poor compliance rate for Bed and Breakfast/Hotel establishments (68%). This contrasts unfavourably with the situation in Wales where local authority compliance figures are higher for all three types of Regulation 9 supply: public buildings (97%), food premises (89%) and Bed and Breakfast/Hotel establishments (88%). The more detailed information in Annex 1 shows that, overall, 156 local authorities (13 in Wales) achieved 100% compliance with the duty to risk assess all Regulation 9 supplies and 122 local authorities (9 in Wales) have fully complied with the duty to risk assess all relevant supplies in their area. In summary, therefore, Table 7 illustrates how the greatest deficit (52%) in risk assessment relates to small, shared domestic supplies (known as Regulation 10 supplies). The problem is most pronounced in England where 57% of these small, shared domestic supplies have not been risk assessed compared to a figure of 17% in Wales. Figure 8 illustrates the cumulative numbers of risk assessments carried out since 2010.

Figure 8: Cumulative numbers of risk assessments completed out since 2010 – England and Wales



Based on the four-year picture published in *Drinking water 2013* the Inspectorate made contact during 2014 with 53 local authorities across England and Wales that appeared not to be on target to comply with Regulation 6. From these discussions, 10 local authorities were confident that they were on target to complete all risk assessments, whereas 32 local authorities indicated that they planned to only comply in respect of any Regulation 9 private supplies in their area. Out of the remaining 11 local authorities most had plans in place to complete all Regulation 9 risk assessments during 2015, however, the plan provided by West Dorset District Council indicated that not all Regulation 9 risk assessments would be complete until March 2017. The plans of at least 10 local authorities in relation to risk assessing Regulation 10 supplies showed that these would not be completed until 2016 at the earliest. The outturn five-year compliance position for England shown in Figure 9 reveals that the 27 local authorities in England failed to risk assess more than 20% of relevant private supplies in their area. Table 10 shows the reported situation for each of these particular authorities and from this it can be seen that 14 local authorities had not carried out any risk assessments at all. A failure to risk assess is not a technicality pertaining to non-compliance with regulations, much more importantly, it points to a failure of the regime of public health protection by the local authorities in question. In this respect the Inspectorate is particularly concerned by the underperformance of two

unitary authorities (Cornwall and Shropshire) and two District Councils (Rossendale and South Lakeland). *The Chief Executives of these authorities have been informed by the Chief Inspector of Drinking Water of this conclusion and the need for a remedial action plan to be put in place to address this failure.*

Figure 9: Regulation 6 compliance performance of local authorities in England – number of local authorities with percentage of relevant supplies with risk assessments

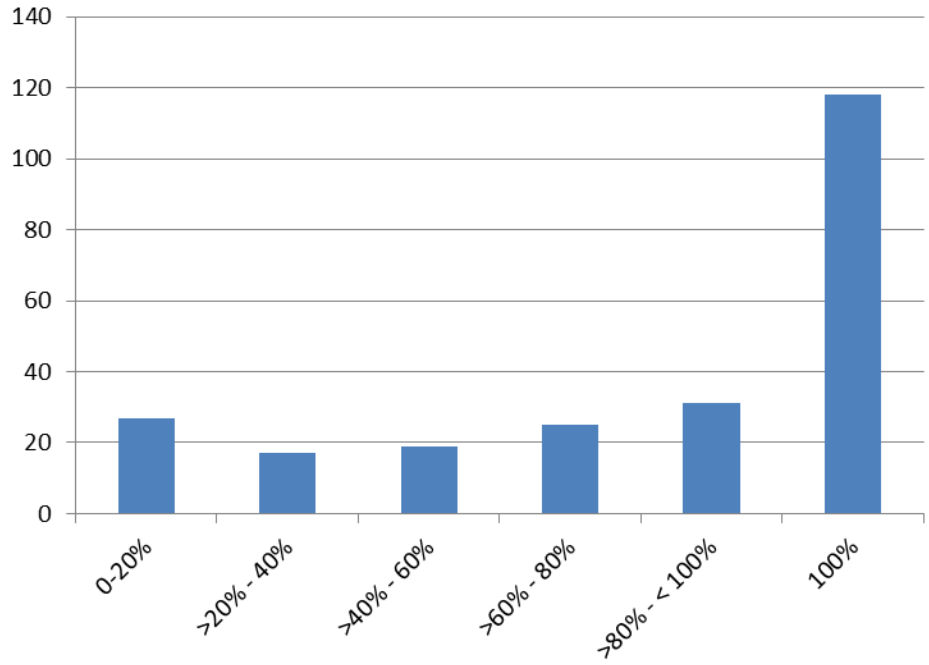


Table 10: English local authorities risk assessing 20% or fewer relevant private supplies in their area within five years.

Local authority	Number of risk assessments requiring completion	Number of risk assessment completed	Percentage of risk assessment completed
Blaby	1	0	0
Blackpool	2	0	0
Guildford	2	0	0
Hackney	1	0	0
Halton	1	0	0
Hammersmith and Fulham	1	0	0
Rochford	1	0	0
South Derbyshire	20	0	0
St Albans City	9	0	0
Stoke-on-Trent	2	0	0

Table 10: Continued

Local authority	Number of risk assessments requiring completion	Number of risk assessment completed	Percentage of risk assessment completed
Waltham Forest	1	0	0
Wellingborough	1	0	0
West Lindsey	7	0	0
Weymouth and Portland	2	0	0
Rossendale	211	8	4
Cornwall	1,349	109	7
East Hertfordshire	41	4	10
NW Leicestershire	8	1	13
North Norfolk	142	21	15
Braintree	51	8	16
Hyndburn	6	1	17
South Cambridgeshire	30	5	17
Teignbridge	193	35	18
Shropshire	492	92	19
South Lakeland	677	127	19
Manchester	5	1	20
Tendring	25	5	20

Identification of Regulation 8 supplies

A Regulation 8 private supply is one where the water originates from a public mains supply, but the users are not customers of a water company, instead they are provided with a supply of water by the occupier of one premises (who is a water company customer) who then further distributes this water to the owners and occupiers of other premises. As reported in *Drinking water 2013*, due to erroneous advice promulgated by consultants, many local authorities were misclassifying a wide range of different public supply situations as Regulation 8 private supplies and thus over reporting the number of such supplies within their area. Since that time the Inspectorate has provided technical support to local authorities to assist with the accurate identification of this type of private supply, by providing training at workshops and through the publication of an Information Note (see *Annex 3*). From this engagement with local authorities, the Inspectorate became aware that a major contributory factor to the misreporting of Regulation 8 supplies was inaccurate information in best practice documents used by local authorities to ensure the safe management of temporary events held in their area. To address the issue, during 2014, the Inspectorate has input correct information on water

matters to the bodies revising the two relevant best practice documents (BS8551 and another document known as the Purple Guide).

The Purple Guide provides useful advice for organisers of large temporary events in relation to managing the health and safety of employees and attendees. It is supported by the Health and Safety Executive and was developed by the Events Industry Forum, an informal grouping of trade bodies and associations with common interests in this area. Chapter 21 relates to 'Food, Drink and Water Provision'. During a planned revision of the Purple Guide in 2014 the Inspectorate was invited to review and comment on the document. This identified various errors in the references to water laws, but more significantly the document incorrectly indicated to users that all water supplies used in temporary events were private water supplies. The Inspectorate's contribution to the review has clarified the position: where an event is held on a premises with a mains water supply, the event is an extension of the existing public water supply arrangement and is thus regulated by the local water company under the Water Supply (Water Fittings) Regulations 1999. Where an event is supplied by a privately owned or operated borehole, well or spring, it is regulated by the local authority under the Private Water Supply Regulations 2009 (England)/2010 (Wales). The definition of a Regulation 8 supply (a private distribution network) was also updated to reflect the Inspectorate's updated guidance issued in 2013.

In parallel, the Inspectorate carried out an audit of the Regulation 8 information submitted to the Inspectorate by local authorities in January 2013 and January 2014. Using this information, local authorities reporting temporary event population information associated with a Regulation 8 private supply were identified and contacted by an inspector. When this audit approach revealed any misclassified supply, the local authority was asked to remove it from the private supply record and resubmit an updated 2014 annual return to the Inspectorate. Table 11 summarises the outcome of this audit and reveals the extent of the misreporting problem. The total number of Regulation 8 supplies included in the 2013 annual returns was 563, compared to the post audit figure of just 83 such supplies in 2014 annual returns. The audit inspector concluded that the main reason for misclassification was local authority staff not being given access to the Inspectorate's Information Note when it was issued in 2013, or it not being provided to new members of staff or its application misconstrued.

Table 11: Summary of the findings of the audit of Regulation 8 supplies

	2013	2014 (before audit)	2014 (after audit)
Number of local authorities reporting one or more Regulation 8 supply.	62	39	34
Number of local authorities reporting one or more Regulation 8 supply associated with a temporary event.	29	17	9
Total number of reported Regulation 8 supplies.	563	130	83
Total number of reported Regulation 8 supplies associated with a temporary event.	57	62	16
Note: The audit was carried out on a subset of the total Regulation 8 supplies identified in data returns to the Inspectorate. The supplies audited were those with the highest temporary populations.			

After five years, it can be seen from Table 3 in Chapter 2 that the final number of Regulation 8 supplies identified by all local authorities in England and Wales stands at 104 (9 in Wales). *The Inspectorate reminds local authorities with Regulation 8 supplies in their area that these must be risk assessed using the Inspectorate's tool to protect public health and inform decision making about the scope of any regulatory monitoring required. It is recommended that all Regulation 8 supply risk assessments be carried out jointly with the water company and its customer (the relevant person).*

3.2 Risk management

Risk management, in the context of the private supply regulations, refers to the decisions and actions that local authorities are required to take when they become aware, through risk assessment, monitoring or by other means (such as consumer complaints or reports of water-related illness from health professionals) that a supply may pose a potential danger to human health or is insufficient or unwholesome. Risk management involves interpreting the results of either the risk assessment or any water quality tests or user complaints in the context of the particular water supply arrangements (source, infrastructure, treatment and management arrangements). It is particularly important that when a local authority receives a report of an adverse sample result from the laboratory that this is interpreted and acted upon in light of knowledge gained through the risk assessment about the particular hazards and controls (risk mitigation) pertaining to the supply in question. Where a risk assessment is in place, the decision making of the local authority should be relatively straightforward, with no need for repeated sampling or time spent seeking the opinion of health professionals. Instead, checks can be made immediately with the owner/manager of the supply to establish if there has been any change in the supply circumstances or any malfunction of control measures. The local authority can then decide if there is a good reason to carry out a site visit to update the risk assessment and independently validate the controls. In making this judgement, the local authority should take into account the competence, attitude and behaviour of the supply owner/manager, thereby focusing their own resources proportionately towards those situations where they add the greatest value in terms of public health protection.

Once a local authority has identified that a supply poses a potential danger to human health, or the quality of a private supply is not wholesome or the volume of water output is insufficient, then action must be taken to ensure that all consumers are informed and given appropriate advice to safeguard their health in the short term. Consumers must also be informed of the nature and timescale of any improvement works needed to affect a permanent remedy. This is achieved by putting in place a Notice formally setting out the requirements. There are two Notice options: for situations where there is a potential danger to human health a Regulation 18 Notice is used; for other situations where there is a problem only with regard to sufficiency or wholesomeness, a Notice under Section 80 of the Water Industry Act 1991 is used. In certain instances it may be appropriate to put in place both a Regulation 18 and a Section 80 Notice. Both types of Notice are flexible instruments that can be varied to reflect the owner's preferred option for providing a permanent remedy or to include additional requirements that come to light as a consequence of an investigation. The

benefits of a Notice (compared to informal verbal or written advice) are twofold. If there is disagreement about the need for a supply to be improved, or there is a dispute over who is responsible for carrying out the work, the Notice provides for a formal process of mediation (appeal) and thereafter, the relevant person(s) is under a legal duty to carry out the necessary improvements.

Sometimes a local authority will encounter a lack of co-operation by a private supply owner and in these circumstances, if necessary, a stand-off situation can be resolved by the local authority serving the owner with a third type of Notice (Section 85 Notice under the Water Industry Act 1991). This type of Notice makes it an offence for the owner not to provide specified information by a given date. In addition, if access to the premises for the purpose of carrying out a risk assessment or sampling is being denied, the Act gives local authorities specific powers of entry that they can and should exercise to gain entry.

Table 12a: Number of supplies where local authorities have served Regulation 18 Notices in 2014

Region	Number of local authorities	Reg 8	Reg 9	Reg 10	SDDW	Total
East Midlands	6 local authorities	-	6	1	-	7
West Midlands	5 local authorities	-	29	5	1	35
East of England	9 local authorities	-	8	3	3	14
North East England	1 local authority	-	8	2	-	10
North West England	14 local authorities	-	46	53	2	101
Yorkshire and Humberside	7 local authorities	-	12	4	-	16
London and South East	14 local authorities	-	24	16	4	44
South West England	18 local authorities	1	53	33	12	99
England total	**75 local authorities**	**1**	**186**	**117**	**22**	**326**
Wales total	**15 local authorities**	**-**	**69**	**77**	**19**	**165**
Grand total	**90 local authorities**	**1**	**255**	**194**	**41**	**491**

Table 12b: Number of supplies where local authorities have served Section 80 Notices or Section 85 Notices in 2014

Region	Number of local authorities	Reg 8	Reg 9	Reg 10	SDDW	Total
East Midlands	3 local authorities	-	2	1	-	2
West Midlands	1 local authority	-	1	-	-	1
East of England*	2 local authorities	-	1	1	-	2
North East England	1 local authority	-	1	-	-	1
North West England	2 local authorities	-	2	6	-	8
Yorkshire and Humberside	2 local authorities	-	1	1	-	2
London and South East	1 local authority	-	2	-	-	2
South West England	1 local authority	-	1	-	-	1
England total	**13 local authorities**		**11**	**9**		**20**
Wales total	**1 local authority**	**-**	**-**	**3**	**1**	**4**
Grand total	**14 local authorities**		**11**	**12**	**1**	**24**
1 Section 85 Notice was served in the East Midlands region on a Regulation 9 supply						

Table 12a shows that across England and Wales in 2014 there were 491 private supplies (326 in England) in 75 different local authority areas where improvements were required to protect public health by means of a Regulation 18 Notice. This represents a fall in this type of risk management activity compared to 2013 when 386 supplies in England were subject to such a Notice.

In England, over half (57%) of these failing private supplies were ones used in the provision of services to the public or which supply more than 10m^3 per day. The remaining improvement Notices were served on small, shared domestic supplies (36%), single domestic dwellings (7%) and private distribution systems (0.3%). Table 12b shows that 20 other private supplies were the subject of a Section 80 improvement Notice put in place by 13 local authorities to deal with problems of sufficiency or wholesomeness. In addition one local authority in the East Midlands served a Section 85 Notice in 2014.

When a Notice is used to improve a failing private supply, the local authority should send a copy of it to the Inspectorate because owners or users of the supply may seek information from the Inspectorate. During 2014, a total of 265 Notices were copied to the Inspectorate representing just over half (52%) of those put in place by local authorities in England and Wales. A review of these Notices shows that the most common health risk covered by these Notices in England was microbiological (84%) with a smaller number for chemical health risks such as nitrate (6%), lead (1%), arsenic (1%), fluoride (1%) and sodium (1%). A further 6% of Notices were

about water being unwholesome by virtue of the presence of excessive amounts of manganese or iron and 0.5% were Section 85 Notices to obtain information.

In Drinking water 2014 the Inspectorate's review of annual returns carried out an exercise to check the 2013 annual returns of local authorities for evidence that appropriate risk management of failing private supplies was taking place. This identified 12 local authorities across England and Wales with responsibility for 50 or more Regulation 9 or 10 private supplies and no use of improvement Notices suggestive of a lack of an effective enforcement policy. Subsequent to this the Inspectorate has carried out a more in depth audit of risk management. Based on 2014 annual returns, no evidence of serving any Notice combined with the reporting of unsatisfactory sample results were used as the criteria to create a list of local authorities for an audit of risk management. This exercise produced a list of 18 local authorities for audit (including nearly all those identified in the initial exercise). Inspectors then arranged to talk with each of these local authorities based on the following audit questions:

- What is the policy for improving private supplies?
- How do you ensure the policy is effective?
- Is informal action used in preference to issuing Notices?
- If informal action is used, how is this recorded/enforced?
- Can you provide evidence of taking action to improve a failing supply?

After the audit discussions inspectors carried out verification checks on requested information or using the 2015 annual return information. The outcome of these audits is summarised below:

No risk assessment or risk management in place

- Two local authorities (Rossendale DC, Scarborough DC)

Risk assessment but no risk management in place

One local authority (Northumberland CC)

Risk Management in place but based on informal action

- 14 local authorities (Ryedale DC, Richmondshire DC, Derbyshire DC, Braintree DC, High Peak BC, Staffordshire Moorlands DC, West Dorset DC, Monmouthshire DC, Shropshire CC, Teignbridge DC, Denbighshire CC, Pembrokeshire CC, Stroud DC, Wiltshire CC.
- Five of the above local authorities put informal advice in writing with a suggested timescale

- Informal action is verified only at next planned sample visit (may be not for up to one year) whereupon if works complete, Notice is not then issued.

Local authority did not respond to audit request

- Two local authorities (West Berkshire DC, Cherwell DC) did not respond to contacts from the Inspectorate by email or phone.

The Inspectorate has concluded that some local authorities do not have effective risk management policies in place and therefore are not complying with Regulations 14, 15, 16. In particular users of failing private supplies are not being provided with information promptly so cannot act to safeguard their health. Also consumers are not being informed about the nature and timescale of the required remedial action. *Local authorities should be aware that this is both a failure in public health protection and a breach of the EU Drinking Water Directive requirements that necessitates a wider and more rigorous approach to audit by the Inspectorate during 2015.*

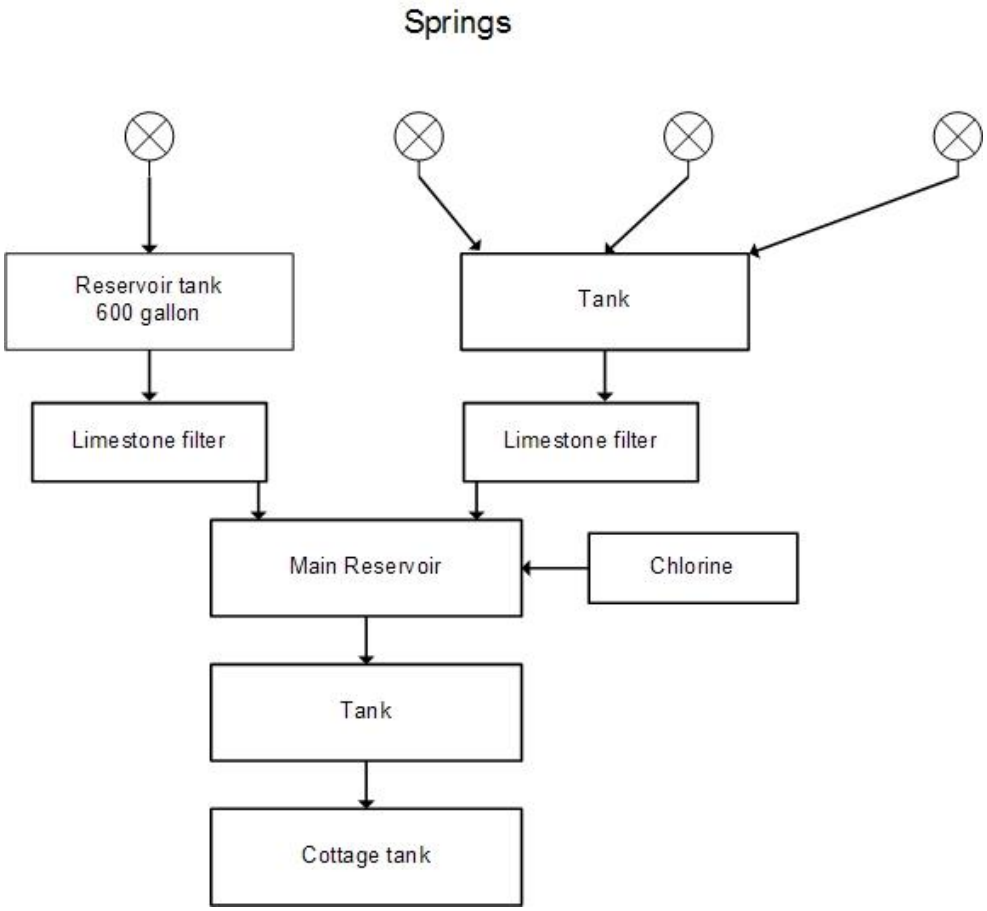
3.3 Risk management case studies – England and Wales

In *Drinking water 2010, 2011, 2012 and 2013* the Inspectorate has included case studies to illustrate the range and scope of the situations that can arise in the risk management of private supplies. This aspect of the report is particularly appreciated by local authorities and has been continued again this year. The selection of case studies is guided by enquiries received during 2014, either from local authorities or private supply owners and their service providers. The Inspectorate has also drawn on records of events notified to the Inspectorate by water companies to highlight, for learning purposes, those scenarios where the task of safeguarding water supplies relies on effective local collaboration and communications between the local authority and its local water company. The case studies published in *Drinking water 2014* will be added to the archive of published case studies on its website and this can be accessed at http://dwi.defra.gov.uk/private-water-supply/Case-studies/index.html as a learning tool for anyone coming new to the subject.

Case study 1 – Verifying that improvement have been made to a village supply

This case study relates to a Regulation 9 spring supply feeding a village with a resident population of 200 and a temporary population of 499 attending private parties. The source comprises a number of springs and collection chambers which range in construction and condition. Most of the collection feed into a main reservoir via a brick built chamber and a raised limestone filter bed.

Figure 13: Diagram of water supply



A sample taken in October 2013 contained coliforms, *Clostridium perfringens* and a pH lower than the regulatory minimum. In response, the local authority served a Regulation 18 Notice in November 2013 requiring users to boil the water, and carried out a risk assessment visit in December 2013 which led to a revised Notice being issued in March 2014. During the risk assessment it was established that the automated chlorine dosing system had been broken for six months. Manual dosing was being undertaken during this time, but the chemical being dosed was not approved for use. The dose should have been varied depending on the volume of water in the reservoir, however, the equipment reading the water level was also broken, as was the pH meter. No maintenance or testing

records were being kept to show the work being carried out to keep the supply safe and sufficient. The improvements required in the Notice therefore included:

- Installation of automated chlorine dosing linked to flow rates and pH levels, including a standby arrangement should one dosing unit fail.
- Routine chlorine monitoring at the outlet of the reservoir and throughout the distribution system.
- Installation of pH correction and monitoring equipment.
- Abandonment of high risk, sedimented springs.

Additional improvements were identified as necessary in the medium term such as covering of the reservoir to prevent ingress, ensuring an adequate contact time for disinfection, and rationalising of springs in use. This reflects a proportionate approach to the regulations, with high and very high risks being addressed in the first instance, but with actions for addressing medium risks being documented so they can be planned for the future.

Together with the local authority, the Inspectorate visited the supply in August 2014 to assess the work undertaken to comply with the Notice. The chlorine dosing system was found to be working correctly, and pH correction was now being undertaken via an automatically controlled dosing system.

Figure 14a: Rudimentary arrangement for chlorine mixing (perspex sheet)

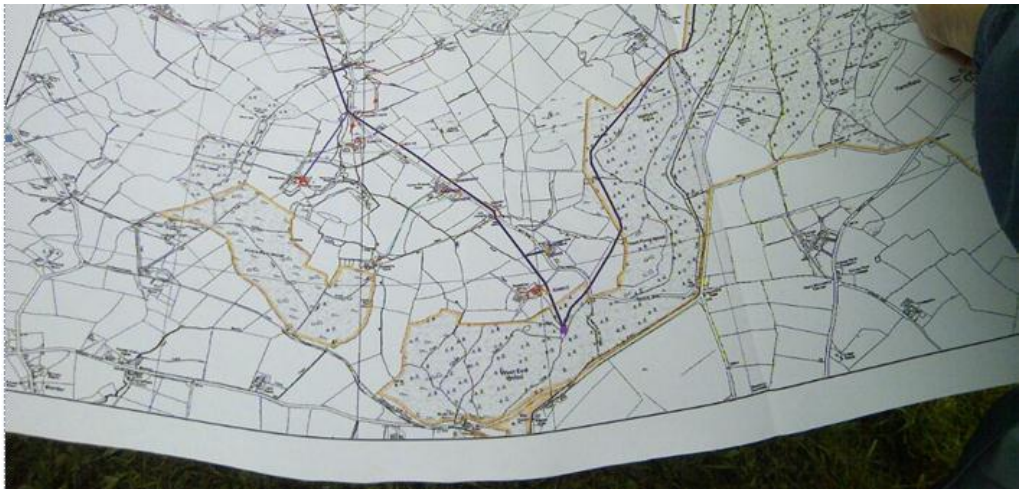
Figure 14b: Improved chlorine measurement and monitoring

Figure 14a shows rudimentary attempts to improve mixing of the chlorine in the reservoir via a perspex sheet hung in the flow of the chlorinated water as the point where it enters the contact tank via a weir. The improved monitoring and instrumentation can be seen in Figure 14b.

Although the system has been improved, further advice was able to be given regarding the chemical mixing, location of instrumentation and contact tank mixing arrangements.

The supply owners produced a detailed plan of the distribution system (Figure 15) and a log book to demonstrate that they were taking on-site chlorine readings at a range of representative points to verify that the residual disinfectant was persisting to the end of the network. The distribution map really supported the Inspectorate's confidence in the ongoing management of this supply – showing details of where the underground pipework was located for any potential repair and maintenance work, together with the diameter of the pipes throughout the network. For many private water supplies, maps of the assets are not available. Where this is the case it will show as a very high risk when captured in the risk assessment tool. Underground assets are not straightforward to locate, but opportunities should not be lost to capture information to put together a picture of the supply system over time. For example, when any mains repair takes place, a record should be made about where it was located, the size and material of the pipe, and its condition. In addition, the location of valves and hydrants are good clues as to the location and probable orientation of pipework.

Figure 15: Plan of the supply system



This case study shows the benefit to owners and operators of the regulatory risk assessment process. Local authorities have a to improve supplies where a risk to health is identified. The risk assessment tool produced by the Inspectorate allows potential hazards to be identified ensuring illness outbreaks are prevented, and the risk assessment process ensures that improvements can be verified.

This case also highlights that despite water treatment being in place, deficiencies in the control, operation and monitoring can make a supply unsafe.

Case study 2: Classification of tourist springs and wholesomeness issues

Historic springs that are used as a tourist attraction

It is not uncommon for a spring to feature as a tourist attraction at a historic site visited by the public and in such instances information about the spring must be on the local authority's private supply record. Such supplies fall in scope of Regulation 9 and require a risk assessment and annual monitoring; however, the context of these supplies means that applying the Regulations is not straightforward and the case study below illustrates how some of the issues with safeguarding this type of private supply can be resolved.

The case study involves a historic drinking water fountain where, during the tourist season, water is served to the public for a fee by people dressed in costume known as 'dippers'. In this way public access to the spring water is controlled and minimised to a 'tasting' experience. (see Figure 16) The spring is not used for domestic purposes at the tourist attraction, there being a separate public supply available for other public facilities.

Due to the 'historic' label attached to this type of supply, it is a common misperception that the quality is consistently good and stable. This perception has often been reinforced by satisfactory results having been reported from occasional and limited testing (coliforms and *E.coli*) carried out under the old 1991 Regulations. Unfortunately such perceptions are often misplaced and this case illustrates why a risk assessment is needed and the hazards that may need to be considered.

In 2010, work in the neighbourhood to repair a gas main led to the rupture of a sewer with consequential contamination of the ground. Fortunately the 'dippers' were alerted to the fact that something might be wrong with the spring water by a strong odour. When the well water was tested it was found to contain very high numbers of *E.coli*. The spring was closed to the public and not reopened until after the pollution event was remedied and water quality returned to normal. More recently, the flow to the spring stopped.

Figure 16: Public spring

While the cause has not been fully made clear, it is probably linked to construction works to create an underground walkway at a nearby hotel. These works required large quantities of groundwater to be continuously pumped out from the excavation to enable the walkway to be built and for the concrete to set. The long-term fate of the spring in terms of both sufficiency and quality will only be determined after the completion of a substantive joint investigation by the local authority and the Environment Agency. As both sets of circumstances illustrate, many 'historic' water features are now located in a very different setting to that which existed in the past. The local features that may once have afforded protection to the source rarely exist today. Furthermore, with the advent of mains water and sewerage supplies, development of the local economy will no longer have awareness and safeguarding of the historic water supply at its heart. There will be a wide range of routine, but far from benign, modern social and economic activities taking place in and around these water features that need to be understood and actively managed if these supplies are to safeguarded for public enjoyment. Far from being seen as an unnecessary regulatory burden on tourism, the carrying out of a regulatory private supply risk assessment should be seen as an essential tool for maintaining the tourism value of these water features.

The risk assessment of this supply was carried out in November 2013. Routes of ingress by vermin and surface water existed due to the piping arrangements and because the feature was open to the elements. In addition to these microbiological risks, the water exhibited a range of other natural characteristics making it unwholesome: iron (>30,000µg/l),

manganese (>2,000µg/l), turbidity (78NTU), pH (5.8), taste (metallic) and odour (sulphurous). To mitigate the microbiological risks by disinfection would have required the turbidity associated with the iron and manganese to be reduced substantively so that disinfection was effective. However, in this scenario the usual reasons for requiring removal of iron and manganese, and pH correction to meet these national standards were not applicable. For example, the water did not need to be clean to ensure that it was not rejected for personal hygiene due to its appearance. Likewise impaired functioning of toilet flushing, laundry and central heating would not arise. The microbiological risk could therefore be mitigated in a practical way by making improvements to the source to prevent ingress and making sure that public access was restricted to just supervised tasting sessions.

The Regulations should not be seen or used as a barrier to the continued use of these historic water features in the future for the benefit of the tourists and the local economy. The regulatory priority should be to carry out a risk assessment and where the supply is not wholesome and safe for all domestic purposes, consider how the public access to the supply can be limited and controlled so as to maintain the tourism benefit. Usually this will mean that steps need to be taken to ensure that any public facilities (toilets, cafes, accommodation) are served by a mains supply and the public are actively discouraged from filling their own containers with water from the historic supply. As part of the risk assessment process, the local authority should ensure that the local planning authorities, utility providers, landowners and the Environment Agency are made aware of the historic feature and take into account the need to safeguard this water resource in terms of decisions they make.

Case study 3: Determining the validity of historic agreements concerning the source of a private water supply

In June 2014, a water company was contacted by a local authority about concerns they had about a drinking water supply as a result of carrying out a risk assessment. The source for the supply appeared to be located on land owned by the water company where there were cattle grazing and using a watering trough next to the abstraction point, for what was understood to be the supply to three nearby cottages.

Figure 17: Cows near water trough

This observation ultimately led on to identifying an historic concessionary supply arrangement derived from a decommissioned water treatment works.

Concessionary supplies are historic agreements made between a landowner and one of the former water boards or water authorities. Usually the arrangement was entered into because there was a need to lay a water main across land not owned by the water board or water authority. In return for access to carry out the works, the landowner may have been granted a right to access, and use, a source of water. A feature of concessionary supplies is that they typically comprise a source of untreated raw water intended for use by the landowner for non-domestic purposes, for example, agriculture or the keeping of livestock. However, in some instances landowners went on to make use of the concessionary supply to provide a water supply for domestic purposes to dwellings. Often this was done without first putting in place the means of making the water supply wholesome and fit for purpose. Unfortunately it is a simple fact of history that these unsatisfactory domestic water supply arrangements came into being and have persisted unknown to the authorities until

recently when an effective regime of regulation for safeguarding the quality and safety of both public and private water supplies came into force.

After being contacted by the local authority, the water company reviewed the historic records. These showed how, in 1938, a concessionary supply arrangement was established between the then local council and the residents of three cottages who were granted use of water from the springs. The agreement allowed the proprietors, their resident families and the direct descendants of these residents to enjoy a free supply of spring water. The arrangements then changed when the local council transferred its water responsibilities to the local Water Board, which were transferred subsequently in 1973 to the Water Authority and in 1989 to the water company that operates the water supply today. A review of land registry documents and title plans for the individual cottages revealed that the concession was only binding if the present day occupiers of the cottages were linear descendants of the original landowner from the 1930's. Since the current occupiers were not direct linear descendants the concessionary agreement was deemed as having fallen away. The outcome of the review was confirmation to the local authority that this was a private supply to be regulated by them (it was not a concessionary supply). The next step taken by the local authority was to advise users of the private supply to boil their water to safeguard health and by November, each of the property owners had accepted an offer from the water company to connect to a nearby mains water supply.

This case study illustrates the value that can be derived from the process of risk assessing private supplies. In particular, the requirement for an up to date schematic outlining the supply from source to tap, together with associated documentation about the abstraction arrangements, affords an opportunity for misunderstandings or changes of use to be identified and remedied.

Case study 4: Deershed Festival

Since 2012, an annual three-day festival has taken place in northern England. Water is supplied for domestic purposes from a borehole. The borehole supplies a lake, which acts as a reservoir and the water is then piped to points around the festival grounds. As the lake level lowers, a pump is automatically started to draw water from the borehole. In the festival's first year the local authority advised that the source should be abandoned as sample results from standpipes around the site indicated microbiological contamination, and during the festival the supply was periodically inadequate. Water was supplied to the temporary event via bowsers.

In preparation for the 2013 festival the local authority undertook a risk assessment. In addition the local authority advised the organisation responsible for the water supply to consult and follow the British Standard for the supply of water to temporary events – BS 8551.

Previous monitoring had confirmed microbiological contamination and high levels of nitrates. In response the organisers had installed a nitrate removal system and UV treatment for the duration of the festival. The local authority agreed the distribution network installation plan which was based on BS 8551, which included the removal and storage of the standpipes and treatment system after the event following an appropriate methodology and at a suitable location to prevent contamination.

In 2013, the festival operated using the borehole and lake supply with monitoring being undertaken by the local authority and the organisers. The results were all satisfactory except for nitrates.

In 2014, the festival organisers relaid the distribution network, and flushed and cleaned the system a week prior to the event.

A sample taken prior to the festival opening contained *E.coli* and coliforms. In response, the company rechlorinated and flushed the supply. The limitations of sampling and analysis meant that there wasn't time to confirm the effectiveness of the second chlorination of the distribution system. Instead, the local authority and the organisers agreed that an alternative source of water should be used as a precautionary measure and installed a bowser to supply the festival.

An investigation revealed that the sample failures were a result of the water stagnating in the newly established temporary distribution network. The water supply company had no procedure to achieve any turnover in the distribution network once it had been flushed and charged. To remediate this, flushing points have been installed to create turnover of water to ensure a residual chlorine level can be maintained.

The local authority have required new procedures to be written to ensure the flushing regime is adhered to and a suitable chlorine residual is maintained to reduce the risk of sample failures from low turnover in future events. BS 8551 is currently being reviewed and the need for adequate maintenance of temporary supplies prior to an event starting will be reinforced.

Case study 5: The objective and purpose of Regulation 8

In February, an MP wrote to the Inspectorate on behalf of a constituent who was complaining about a 'copper residue' in her drinking water. In line with normal practice, the Inspectorate contacted the water company to find out if they were aware of the complaint and, if yes, to establish whether the company had investigated appropriately or, if no, to require the company to investigate. The company was able to confirm that the constituent was not a customer on their billing records, but had previously requested a direct connection to the mains supply free of charge. Her request had been handled as a first time connection request, the quote for which was influenced by the nearest main being several miles away. When handling her request the company did not recognise, and inform the local authority, that the existing supply to the property was a mains water supply provided by means of a 'further onward distribution' arrangement across land owned by another party (as defined by Regulation 8 in the private supply regulations).

The Inspectorate's next action was to contact the local authority to make them aware of the water quality complaint associated with the Regulation 8 supply. In March, the local authority confirmed that while they had discussed and agreed the Regulation 8 arrangement with the water company, they had not been able to investigate the complaint because the complainant was not contactable and the owner of the adjacent premises had recently passed away.

In May, the local authority contacted the Inspectorate again to report that the matter had been progressed, not by them, but by the water company who was installing a free connection to the mains supply. The company was contacted again by the Inspectorate whereupon it was explained that other new mains work was being carried out in the supply zone to improve resilience against insufficiency, therefore they could now meet the original request for a direct connection to this property at no expense to the owner. The Inspectorate pointed out that on completion of these works, the duties on the local authority under the private water supply regulations would fall away, but the duty to investigate the water quality complaint did not fall away, instead it transferred to the water company.

In July, the company reported that the connection to the property had been made to the company's newly laid main and a water fittings inspection had been carried out which had confirmed there was no copper pipework inside the property. Additionally, sampling had been carried out and all the results were satisfactory. This information enabled the Inspectorate to answer and close the original enquiry from the MP.

This case study highlights how requests for new connections to water companies provide an opportunity to identify Regulation 8 supply situations. All companies should update their new connections procedures so that staff are aware that these supplies should be recorded on the private supply record and therefore they should notify the local authority whenever such an arrangement comes to light.

While it is not uncommon for consumers to make a complaint about their drinking water when they have exhausted all other routes for resolving a supply problem, as this case illustrates, care is required to ensure that best endeavours to resolve a supply problem do not distract from the duty to carry out a timely investigation of any reported water quality concern. Regulation 8 was introduced into the new private water supply regulations in 2010 because it was known that this type of supply arrangement usually lacked any professional oversight in its set up, maintenance and management, causing a disproportionate and growing number of disputes triggered by impaired quality or sufficiency for which there was no means of resolution. Typically, to supply a property in this way the owners will have had to lay a long service pipe and connect this to another service pipe located on an adjacent premises. In doing so the owners may not have paid regard at the time to ensuring that the pipe materials and installation were both compatible and suitable. In this case it was found retrospectively that there was no copper plumbing within the property, therefore, if the supply arrangement had not ceased, the local authority would have been under a duty to establish if any part of the 'onward distribution' network was made of copper, whether its condition was the cause of a quality problem and, if so, who was responsible for its replacement. To enable such an investigation, the local authority would need to trigger the duty of the water company to carry out a fittings inspection at the primary premises (the customer of the water company) and report on the nature and condition of the onward distribution arrangement. The intention of Regulation 8 was twofold: in the short term to provide a means for remedying deficiencies and preventing future disputes from arising when the supply arrangements cease to be serviceable; and, in the longer term, by identifying these supply arrangements to enable planning by the water company to improve the local supply infrastructure over time so that all such properties can benefit in the future from a secure and safe direct connection to the public mains supply. The Inspectorate expects water companies and local authorities to

be working jointly to put in place plans for the eventual removal of all Regulation 8 supplies. In this planning process, the risk assessment and monitoring powers of both water companies and local authorities, which are now fully aligned, should be used to gather evidence that can then be used to enable any investment in improvements to the public water supply infrastructure necessary to achieve the goal of making 'onward distribution' obsolete.

Case study 6: Successful prosecution of a relevant person for non-compliance with a Regulation 18 Notice

This case study involves a borehole supplying three properties, one owned by the farmer on whose land the source was located, and which then feeds two separate downstream properties. It was risk assessed and sampled by the local authority in October 2012 and it was deemed to constitute a potential danger to human health. There was broken fencing around the borehole headworks, the headworks itself was not sealed; culminating in evidence of grazing sheep having defecated directly onto the borehole apron as Figure 18 shows. Water was stored in four tanks downstream of the borehole which were found to have no lids, and in a poorly maintained shed. This allowed contamination of the tanks with particles of rust and polystyrene. Figure 19 is an example of holes in the roof of the tanks which allowed the potential for further contamination or vermin to enter.

Figure 18: Area directly around borehole

Figure 19: Storage tank with holes in roof

The results of the sampling confirmed that Enterococci, *E.coli* and coliforms were all found to be present. A Regulation 18 Notice was served containing health protection actions requiring all water to be boiled before consumption. The Notice also required repairs to be made to the borehole chamber to prevent surface water ingress, together with installation of a stock proof fence, new watertight chamber covers, installation of treatment, new reservoir tanks, vermin-proof overflow pipes and other actions to ensure suitable air gaps and backflow protection were in place. The local authority also provided a copy of the risk assessment, highlighting the key areas of risk.

The local authority arranged meetings to see how work was progressing in December 2012 and March 2013. The owner did not make himself available on either of these occasions, but on one of the visits a further sample was taken from an outdoor sample point which contained Enterococci, *E.coli* and coliforms. A further visit was undertaken in April 2013 when it became apparent that no work had been done to improve the supply. The local authority liaised with DWI regarding a way forward, and served a Section 80 Notice so that works could be done in default. The owner was contacted again in June, but no progress had been made. The local authority reminded the owner of the obligation to comply with a legal notice. Following information that a quote had been obtained from a local installer for treatment, the Notice was extended until September and the source was sampled again whereupon it was found still to contain Enterococci,

E.coli and coliforms. It became apparent that installation of treatment was not being progressed by the owner, so a Regulation 18 Notice was served in October 2013 based on new information from the most recent sampling requiring all water to be boiled before consumption. The Notice also required repairs identified previously to be made.

The owner was invited to attend an interview under caution with the local authority (under the requirements of the Police and Criminal Evidence Act). He did not attend either of two dates set for this meeting. At this point the local authority issued a summons for the owner to appear in court in November. The owner did not respond to any solicitor's letters and did not turn up for the hearing. Following this, a further summons was issued in February and the case was heard at the Magistrates' court.

The Magistrate had not previously encountered any cases involving private water supplies and initially thought that the case was just about a breach of a Notice. Once the public health risk was explained by the local authority, they took a very serious view of the offence. The local authority were called into the witness box in order for the Magistrate to understand the difference between actual and potential risk. The local authority pointed to the failed sample results, but said that even if the samples had been clear a Notice would have been served based on the potential risk observed in the assessment.

The Magistrate found in favour of the local authority, and in summing up stated that there was a real risk to public health as downstream properties included young children and elderly residents. The defendant was fined £1,500 plus costs for non-compliance with the Notice, and the Notice was re-served with a deadline of May 2015. Local authority costs claimed were reduced to less than a quarter of the actual costs in order that there would be adequate money to improve the supply. The local authority has requested a meeting with the owner to discuss progress.

This case study highlights the powers that local authorities have at their disposal to regulate private water supplies and protect public health. These powers can ultimately be enforced in a court of law if necessary and incur additional cost for the supply owner.

Case study 7: Change of use from non-domestic to domestic purposes at a public building

This case study involves a supply owned by an organisation which provides vocational training to teenage pupils. In 2010 it acquired a site comprising a number of metal sheds and outbuildings with water provided by a shallow borehole. The site at that stage was only used as mechanical workshops and the water supply was used for non-domestic purposes.

In 2012, the organisation expanded the site usage to six classrooms and the workshops, together with associated offices, toilets and washing facilities. Unfortunately the site manager and the school did not realise how these changes impacted on the water supply classification bringing it within scope of the private water supply regulations. The site manager arranged for the installation of water treatment (filtration and UV disinfection) and an annual monitoring regime. The initial samples in 2012 gave satisfactory results however, in 2013, the sample contained coliforms and exhibited a very high nitrate result of 130mg/l. Action was taken in relation to the coliform failure but the laboratory did not flag the failed result therefore it was overlooked. In 2014, the results of the annual sample again showed there was a problem with nitrate (value of 153mg/l) and on this occasion advice was sought from Public Health England signage put in place advising that the water should not be used for drinking with bottled water provided for students, staff and visitors.

The company that originally drilled the borehole in 1964 was asked to install treatment for nitrate, and subsequently this was installed in the form of point of use devices at each of the water points around the school. However, samples taken subsequently from three of these points gave nitrate results above the standard (ranging from 70 to 110mg/l). The discussions that then followed on between the borehole contractor and the manufacturer of the treatment units identified that the flow rate at the taps was too high for effective nitrate removal. Additionally the hardness of the water, although not excessive, was above that recommended by the manufacturer for effective functioning of the equipment. Information about the hardness of the water had been available but was not used to inform the selection of appropriate treatment. Although flow restriction valves were then fitted to the drinking water points this action was not sufficient to reduce the nitrate level to below the standard.

When the Inspectorate became aware of the situation, the supply owner was advised to register the supply with the local authority. Subsequent to this the local authority visited the site to understand the up to date situation. This revealed that the root cause of the nitrate problem had been traced to the application of nitrogen fertilizer to a small patch of grass in the immediate vicinity of the borehole to enhance the appearance of the

entrance to the premises. Additionally it had been identified that chickens were kept on the premises and there were small scale farming activities on the neighbouring land. Source protection measures had been put in place, for example, fertilizer was no longer being applied and chickens were no longer kept in the grounds, and monitoring had shown that these measures had been successful at improving the source water quality. However, results from other local groundwater sources in the area indicated that there may be a wider problem that could impact on the source requiring further measures or treatment in the future.

This case study highlights the need for local authorities to have in place a process of periodically checking that the use of a private supply has not changed. It also illustrates the difficulties owners face with identifying competent installers of water treatment systems. In this regard the Inspectorate has reviewed and revised the manual of treatment for small water supplies to include an annex providing guidance on how to select a competent treatment installer. Together with the drinking water regulators in Northern Ireland and Scotland, the Inspectorate is also discussing with installers the development of a Code of Practice that can be recognised by, for example, BSI. This case study also provides background to questions in the treatment plant design section of the Inspectorate's private supply risk assessment tool.

Case study 8: Dealing with common enforcement challenges: as illustrated by a case of a Regulation 18 Notice served on a large private supply to a school

This case study concerns a boarding school with around 300 pupils and staff. The premises is situated in a suburban area, but enjoys its own expansive private grounds. The school is served by a private water supply which draws water from a borehole, into a storage tank. Chlorine dioxide is generated on-site and is dosed into the borehole water just prior to where it enters this storage tank. There is a standby mains supply to this tank, fitted with appropriate backflow protection (air gap). The dose of chlorine dioxide is continuously monitored with an alarm setting of 0.42mg/l which triggers an SMS message to maintenance staff and shuts down the chlorine dioxide system.

The supply was originally risk assessed by the local authority in 2011. The monitoring history was satisfactory and no high risks requiring mitigation were identified, although the range of hazards covered by the risk assessment methodology was fairly limited. The compliance sampling strategy was confirmed as two checks and two audit samples annually. Four convenient sampling locations were identified for these purposes and each was sampled annually by means of two sample visits a year. In

October 2014, one of these planned samples was reported as containing both *E.coli* and Enterococci. The tap in question was located in the caretaker's lodge and was used mostly by cleaning staff and by pupils changing after sports lessons. The sample was collected by a company contracted to the local authority (working towards accreditation under ISO17025) and, a UKAS accredited laboratory carried out the analysis.

On receipt of the unsatisfactory sample report, the local authority served a Regulation 18 Notice on the relevant persons to restrict the supply while an investigation was carried out. The school was given options for restricting the supply – boiling all water for domestic purposes or use of an alternative supply (mains water, bottles, bowsers etc.). The school concluded that boiling water was impractical and challenged the need for and proportionality of the Notice. The water service contractor to the school then sought independent advice from the Inspectorate. It was explained that the local authority had a duty to serve the Notice to protect public health in the short term, allowing time for an appropriate investigation and implementation of any identified remediation measures found to be needed.

The Inspectorate was concerned to note that only the contractor knew about the existence of a back-up mains supply. If this information had been known to the school management or the local authority then it would have been straightforward for alternative supply arrangements to have been put in place without delay. The risk assessment tool provided by the DWI includes the need for a documented plan for alternative supply arrangements and flags this as an essential requirement, particularly for a supply serving a public building. The tool generates a high risk if an emergency plan and communication strategy is not in place. The school has since put in place such a plan.

Investigational resamples taken from the original tap continued to fail for *E.coli* and Enterococci and this led both the school and its contractor to argue that the compliance sample should be from the storage tank instead. It was necessary for the Inspectorate to give further advice, explaining that the definition of the point of compliance, which derives from the EU Drinking Water Directive, is 'at the point where water is drawn off for use', i.e. taps. The school was very persistent in explaining that water drawn from the tap in question was only used by cleaning staff and for hand washing, and also that water consumed from the tap would always be boiled in a kettle before use. It therefore became necessary for the Inspectorate to explain Section 218 of the Water Industry Act 1991 which defines the 'domestic purposes' which fall in scope of the Regulations: drinking, food preparation, cooking and washing (sinks, baths, showers) and other sanitary purposes.

Following this event, the local authority has updated the regulatory risk assessment using the Inspectorate's tool. While improvements had been made around documentation, records, alternative arrangements etc. there were still some recommendations made (e.g. recording dates for tank cleaning). The school has also implemented a water safety plan approach, which requires the supply assets and management arrangements to be comprehensively documented so that there is a schematic diagram and clear procedures covering alternative supply arrangements and the responsibilities of the various parties for maintenance and communications. Additionally, the school instructed its maintenance staff to inspect taps around the site and take steps to remove or put in place 'not for drinking' signage for any tap at high risk of becoming contaminated. This facilitates the local authority collecting future compliance samples from any tap used for domestic purposes at random, thereby building up a monitoring history representative of water 'at the point of use' over time.

This case study illustrates some of the common misperceptions that tend to cause either private supply owners or their contractors to challenge the enforcement activities of local authorities. Whereas the Inspectorate will always step in, when asked, with impartial authoritative advice aimed at helping all the parties to a common understanding of their roles and duties, local authorities could reduce the number of occasions when such interventions were necessary if they were to provide clear information to supply owners about the duties and powers of relevant persons and themselves, as set out in the Water Industry Act. The Inspectorate has observed how most of the information provided to private supply owners by local authorities is focused on the changes to the Regulations that came into force in 2010 therefore lacking the wider context of the legal framework. When supply owners and managers do understand their responsibilities for the sufficiency and wholesomeness of a water supply provided for domestic purposes, and realise that these duties are nothing new (set out in Acts of Parliament dating back as far as 1934), they are more inclined to compliant behaviour and more accepting of the process of regulatory risk assessment, monitoring and enforcement as valuable reassurance that they doing the right thing.

Case study 9: Disconnection of a supply

This case study relates to a Regulation 9 supply to a large country estate in Hampshire, the source of which is a borehole located on a parcel of land upon which there are various cottages and farms. The supply serves 28 properties and businesses directly (150 – 160 persons), and of these six customers who use the water supplied for agricultural purposes. The total estimated usage is 68m^3per day. There are additional subsidiary users supplied via these directly supplied customers. One such customer is a farm, which until recently onwardly supplied untreated water to several other properties including six cottages. Under this arrangement the farm paid the estate for the water used.

Over the years, four of the cottages were sold off by the farm, but it continued to supply them using the existing private water supply and distribution network. Water meters were installed to enable the farm owner to charge the cottages for the water they used at comparable local water company charges plus a standing charge for pipework repairs to the cottages. The local authority has been led to believe that deeds exist which state that the farm is obliged to supply the cottages as long as the water is supplied by the original estate, but to date have not seen a copy.

In the spring of 2013 the owner of the farm wrote to the occupiers of those four cottages to say that he was proposing to sink his own borehole, but would continue to supply all the cottages from the new supply and levy charges in line with local water company charges. The cottages attempted to negotiate with the estate to stay on the original estate supply, but this was deemed impractical due to cost, additional rights of easement required and a perceived reluctance of the estate to connect ‘new’ customers to their supply.

In November 2013, the new borehole was installed at the farm together with a pre-filter and UV treatment. The four privately owned cottages appointed a solicitor to negotiate a written contract to ensure sufficiency and to fix charges, but the farm owner responded that no legal agreement was required, as he would continue to supply as previously. This resulted in a standoff during which the owners of the cottages did not pay any water bills. In April 2014 the farm owner wrote to the solicitor stating that he was giving the four cottages notice to seek an alternative supply as he would cease supplying them on October 31 2014. Under the Water Industry Act, it is permitted for private supplies to be terminated or withdrawn where all parties agree. Where agreement is not reached, then a local authority may serve a Section 80 Notice preventing immediate disconnection by the supply owner, but allowing a reasonable timescale for consumers to find a new supply. What constitutes a reasonable period will be determined by availability of alternative sources, the quality of any

alternative source, proximity to public supplies etc. It is notable that in this case the local authority were not made aware of the intended disconnection.

The cottage owners independently contacted a borehole contractor and three new boreholes were sunk; one borehole supplying two cottages and one at each of the other two cottages. The owner of one of these had taken out an indemnity insurance to cover such an eventuality when he purchased the property and the insurance company would not fund a shared borehole.

On 28 October 2014 the borehole contractor for the farm contacted the farm owner to say that it was unlikely that all cottages would be connected in time for the deadline by which the farm said it would cease supplying the cottages. A further call was made by the contractor on the 30 October, again seeking confirmation of an extension at which time the request was allegedly refused.

On Friday 31 October, cottage No.3 was connected to a new supply and at 0900 the following day the supply from the farm to the cottages was disconnected and the pipework was dug up leaving cottages 1, 2 and 4 without water.

On Monday 3 November the supply to cottage 4 was connected, but cottage 2 contacted the local authority to report that they had been without water over the weekend. The farm alleged that they had misunderstood the status of the works and thought that all cottages were connected, and they could stop supplying.

The following day cottage number 1 was connected but cottage 2 had no supply due to an internal blockage. The owner of cottage 2 had apparently declined to have any treatment installed. The supply was eventually reinstated on the Wednesday. However, by the Friday of the same week further blockages at cottage number 2 occurred, causing the supply to fail. Investigations revealed that during the sinking of the borehole, the drillers had dropped a plastic sleeve into the borehole and rather than remove it conventionally, had elected to use the drilling rig to break it into smaller pieces which could then be pumped out of the borehole and into supply. The lack of filtration on the supply meant that these fragments were continuing to cause blockages. The owner of this cottage contacted the local authority to request action be taken against the farm owner for disconnection of supply in contravention of the Water Industry Act 1991 (‘the Act’). He is pursuing civil damages against the farm owner and alleges the cutting off of the water was a breach of human rights. He also requested that the authority provide him with an alternative supply until the situation was resolved.

Under the Act, the local authority has the discretion to serve a Notice where a supply is failing, has failed or is likely to fail to provide a supply of water sufficient for domestic purposes. In this case, the local authority was made aware of the insufficiency issue after it had occurred, and they were assured that a new supply was due to be connected within a few days. Therefore they decided that a Section 80 Notice would not be beneficial.

The owner of cottage 2 has since employed a different borehole driller to sink another new borehole for himself and cottage 1, and is in dispute with the original contractor over non-payment of invoices.

This case study highlights several points. Firstly, the fact that the current regulations do not obligate creators of new private supplies to inform local authorities. Had the local authority known about the new private supply to the farm, and the threatened disconnection, they could have served a Notice under Section 80 of the Act for threatened insufficiency to ensure the relevant parties agreed a sensible plan.

Secondly, it highlights the need to be aware of the implications of purchasing a property on a private water supply. The owner of cottage number 3 was astute in taking out indemnity insurance against any problems with the supply, and was therefore funded to develop their own supply once notice of disconnection was given.

Finally it demonstrates that borehole drilling can be a complex operation and competent contractors need to be employed. DWI were instrumental in organising a borehole users conference in October 2014 to engage borehole drillers in the first steps towards an industry code of best practice for borehole installation. This conference also introduced the industry to the needs of regulators and public health professionals with regard to private water supplies and a follow-up conference is planned for 2015. The Inspectorate has provided a useful link on its website to some guidance for borehole drillers produced by our counterparts in Ireland http://www.epa.ie/pubs/advice/drinkingwater/advicenote14.html. The risk assessment tool produced by the Inspectorate for use by local authorities carrying out risk assessment of supplies identifies a number of aspects of borehole design as potential hazards. This may be used as the basis of advice by authorities to anyone considering developing a new private supply as to what they should ensure their contractor installs, together with any quality validation.

Case study 10: Remediation of a Regulation 9 borehole supply leading to the creation of a new Regulation 8 supply – an exception to the guidance on Regulation 8 supplies?

This case study relates to a private borehole on a farm estate that also serves 27 residential properties; some owned by the estate, with the remainder in private ownership. Borehole water is pumped to two large reservoirs that provide supplies to each of the properties by gravity. The standby backup supply to the reservoirs was by means of a metered connection to the local mains water supply located within a few metres of the reservoirs.

Monitoring undertaken following the introduction of the new private supply regulations identified that the borehole supply consistently exceeded the standard for fluoride (1,500µg/l) with the highest value recorded as 1,600µg/l and the lowest being 1,540µg/l. Results exceeding the standard for sodium were also recorded. The local authority sought advice from PHE, who in turn consulted the Inspectorate and it was agreed that the local authority should serve a Regulation 18 Notice to require remediation because both fluoride and sodium are health-related standards.

As required by the Notice, the relevant person (the Estate manager) considered the various options for dealing with the situation (treatment, blending, mains supply) and concluded that the most cost effective and reliable method was to feed the reservoirs with mains water. A meeting was held with the local water company about uprating and designing the mains connection to the reservoirs so that it complied with the Fittings Regulations. Following these works, the Estate would be in compliance with the Regulation 18 Notice; however, due to some of the properties being in private ownership, the arrangement would mean that the Estate would be 'further distributing mains water' to these privately owned properties thereby creating a new Regulation 8 private supply.

Before confirming the proposal as meeting the requirements of the Regulation 18 Notice, the local authority sought advice from the Inspectorate. As set out in current guidance[9] on Regulation 8 supplies, the purpose of the Regulation 8 legislation was to provide a means of dealing with problems of sufficiency or wholesomeness arising from existing supply arrangements involving the onward distribution of mains water. The intention behind the legislation was for this type of indirect mains water supply arrangement to be identified (and where necessary remediated) and prevented from being extended. The ultimate aim of the legislation was to

[9] Current guidance on definition of a Regulation 8 supply was issued by the Drinking Water Inspectorate on 23 April 2013. All previous guidance on Regulation 8 supplies was superseded and should not be used.

ensure that over time all properties served by a supply of water from the mains would become direct customers of a licensed water company thereby eliminating the risks associated with these hitherto unregulated supply arrangements. This type of historic supply arrangement is usually associated with a lack of clarity regarding ownership, management and control, and the infrastructure is often unsuitable or beyond its useful life. The consequences of these attributes was a growing number of protracted disputes between neighbours with consequential quality and quantity complaints that were seemingly unresolvable by water companies and local authorities.

In this case, the local authority was faced with making a decision that would endorse the creation of a new Regulation 8 private supply, contrary to guidance from the Inspectorate. However, as the purpose of the new Regulation 8 supply was to deal cost effectively with a failing borehole supply that was the subject of a Regulation 18 health-based Notice, and the mains connection was one that was pre-existing, not new, the Inspectorate considered that the local authority had a sound evidence base for endorsing the approach of creating a new Regulation 8 supply. The Inspectorate emphasised the need to ensure that the new Regulation 8 supply met all of the requirements of the Fittings Regulations, there was clarity regarding management and control, including maintenance and costs, and restrictions in place that meant it could not in the future be extended to additional premises.

The Inspectorate also advised that had there been no pre-existing standby mains connection in place, the local authority approach would have needed to be different. The local authority would have needed to require the water company to prepare detailed proposals for the separately owned premises to become direct customers of the water company. If it was then found that all of the associated costs of these proposals could not be met by an agreement between the parties (the Estate, the private premises owners and the water company) then the local authority would be able to revoke the original Regulation 18 Notice, replace it with an equivalent Section 80 Notice for lack of wholesomeness, and then commission the works directly using Section 81 powers, enabling recovery of the unfunded portion of the costs by means of a putting a charge on the properties.

The Inspectorate recommends that water companies and local authorities put in place working procedures for the joint working necessary for local authorities to make use of their Section 81 powers in the Water Industry Act 91, to achieve the national water policy objective (first set out in the Water Act 1945), for a piped mains supply to be accessible to all domestic premises in non-urban areas. As indicated in *Chapter 2: Number and nature of private water supplies in England*, the Inspectorate is working at national level with Ofwat to eliminate any perceived or actual regulatory

barriers to improving and regularising mains water provision in localities where local authorities' implementation of the private water supplies regulations has provided evidence of need.

Case study 11: Illegal connection

On 13 November 2014, a water company meter reader visited a farm near Pickering in North Yorkshire to take a meter reading, and discovered the meter was running backwards. The meter reader also identified that there was a private borehole on site being used for domestic purposes, and arranged for a Water Regulations Inspector to attend site.

The company promptly investigated in order to establish whether the meter was running backwards due to a fault or whether there was an illegal cross connection between the mains water supply and the private borehole. Chlorine readings indicated that there may have been a cross connection with the private, untreated borehole supply. The Water Regulations Inspector identified an illegal cross connection and removed it. Figure 20 shows the pipework following removal of the cross connection.

Although the farm had a private supply, it was classified as a single domestic dwelling and had not been risk assessed as the owner of the supply had not requested it. In January 2014 the owner had returned a completed form to the local authority indicating that there was no treatment on site other than an ion exchange unit for softening. The owner informed the company that he had recently experienced a power dip on his borehole which had led to low pressure at the tap. In order to increase the water pressure he had opened up the stop tap allowing the cross connection between private and public supplies. The site had not had a water fittings inspection, but the company were aware of the dual supply and had included the site on a list for a future inspection. The meter is scheduled to be read quarterly, but in reality it had last been read in June 2014, and potentially this cross connection could have been open since then, although the owner informed the company it had only been open for a week.

It was noted that following removal of the cross connection, the valves were leaking even when shut off, so even with the pipe in place and valves shut the mains supply would have remained unprotected as there was still a risk of untreated water entering the mains distribution system through this connection.

Figure 20: Pipework after illegal cross connection had been removed

Prior to the cross connection being removed, the private borehole was found to be delivering a pressure of 4.5 bar and the water from the private supply could potentially have reached the pumping station supplying the mains water in addition to the properties supplied from the pumping station. In reality, due to pressure being maintained by the pumping station, it was thought that the farm and a neighbouring farm were the only ones affected. Historic water quality data for the borehole was generally good, and a microbiological sample taken as part of the investigation was satisfactory. However, phosphate results at a neighbouring farm were lower than would have been expected for an exclusively mains fed supply and bottled water was supplied as a precaution until flushing had been undertaken and satisfactory sample results reported.

The water company are to be commended on taking prompt action when they discovered a potential issue which led to a quick resolution. However, this cross connection was only discovered by accident following an unusual meter reading.

Elsewhere in the country, backsiphonage from a private water supply was also uncovered during a routine visit in August by a meter reader in North Devon for the local water company. The supply comprised of a farm, a commercial cheese dairy and a house. The site has a public supply connection and two boreholes – one of which is 25 years old, the other is more recent.

The farm manager described the supply arrangements; the mains supply feeds the house and the dairy. The borehole water is not hydraulically linked to either of these premises. The untreated borehole water feeds into a large black plastic tank to supply the farm (Figure 21) – this has a connection to the mains supply for a top up if required. These arrangements mean that borehole water is only used for domestic purposes at the farm, therefore the supply constitutes a single domestic dwelling and as such the owner had not requested a risk assessment or monitoring.

Figure 21: Tanks in which mains water and borehole water were blended and stored

A water fittings inspection revealed that the mains connection into the storage tanks for the farm had no air gap as required and therefore the borehole water could backflow into the public water supply through the meter as observed by the meter reader. The water from the boreholes has very similar water quality to the water in the public supply. Initial sampling surveys were therefore inconclusive as to whether borehole water was circulating in the wider public distribution network. Microbiological results showed that the water supply at the farm itself and one downstream property contained coliforms, and the downstream property also contained Enterococci. Further samples over the following two days were microbiologically satisfactory.

The company served a water fittings Notice requiring several improvements, including the creation of an air gap between the private and public supplies where they mix in the tanks. They also replaced the meter with one with an inbuilt non-return valve. In this case the water company were not aware of the private water supply on site and therefore the potential for cross-connection or backsiphonage.

These cases highlight the need for a proactive approach to be taken to risk assessing supplies where there may be public and private supplies connected together and the collaboration needed between local authorities and water companies.

It is also a reminder to local authorities that the Water Fittings Regulations are enforceable where cross connections with mains supplies exist.

Case study 12: Action in the event of a failure at a single domestic dwelling

This case study relates to a rural supply fed from a spring directly to a farmhouse, and a farm on which only the resident farmer works, therefore constituting a single domestic dwelling. There is no treatment on the supply, and the farmer approached the local authority to take a sample to satisfy the farm assurance scheme he was part of.

The local authority sampled in September 2013 and the result showed that the supply contained *E.coli*, although no Enterococci were found in the sample. The local authority sought advice from the Inspectorate as to whether they should deal with this failure through advice as described in Regulation 16 where a single domestic dwelling is involved, or whether they should serve a Notice as a risk to health had been confirmed?

The Inspectorate confirmed that both options were available to the authority, unless the farm had other employees who used the water, or if it was used in the manufacture of food. Although neither of these circumstances existed, the local authority decided to serve a Regulation 18 Notice. However the Notice only required the farmer to boil the water before use. The Regulations specify certain minimum requirements that must be contained in a Notice:

- Information about the private supply to which it relates (a supply having been confirmed by magistrates as comprising the entire supply system, including all sources, treatment and distribution system).
- The grounds for serving the Notice (for example, a sample failure, a risk to health identified during risk assessment, etc.).
- Options to prohibit or restrict the supply (these will vary depending on the nature of the risk; is it chemical or microbiological contamination?).
- What action is necessary to protect human health.

In this instance, although boiling the water is a good health protection measure for microbiological contamination, this is only ever a short-term measure to protect public health. Notices must contain longer term remediation actions required to deliver sustainable improvements to failing water supplies. The Regulations also require a Notice to be revoked once there is no longer a risk to health. In the case of a Notice which only requires the relevant person to boil the water, appropriate criteria should be used to determine when the risk is no longer present. A single satisfactory sample result is inadequate to demonstrate the risk has been removed, especially if no remedial work has been carried out.

In the case of a single domestic dwelling, or even a small shared supply, opportunities to confirm that other actions have been taken are few and far between. However, having served a Notice, the local authority ultimately needed to confirm if it could revoke the Notice, affording it the opportunity to check progress.

Case study 13: What constitutes a 'commercial premises' within the context of the legislation?

This case study relates to a common source of confusion where terminology relating to public and commercial use is often misunderstood and wrongly applied. It cites an enquiry which provides a useful opportunity to put into context the scope of the Regulations in terms of how Regulations 8, 9 and 10 are interpreted by local authorities when discharging their duties under The Private Water Supplies Regulations 2009 (2010 in Wales).

In October 2014, the Inspectorate received an enquiry from a property agent requesting an interpretation of the definition of 'commercial premises', and the source of the legislation from which this definition is derived.

The 1998 EU Drinking Water Directive sets out member states' obligations in respect of water intended for human consumption and food production undertakings, which have been transposed by the UK Government into the Private Water Supplies Regulations 2009 (2010 in Wales), which were made law under the Water Industry Act 1991. The duties vary according to whether the private water supply is being used for domestic purposes (defined in the WIA 1991), intended for 'human consumption' (defined in Regulation 2 – Scope of the Regs) or is in a public or commercial activity.

It is important to note that the terms *commercial premises* and *commercial property* are not defined in the legislation. This is because the nature of the activity for which land and/or buildings on land supplied by a private water supply is being used, is not necessarily relevant, only where the water is being consumed for domestic purposes within the scope of Regulation 2(b) of the Regulations (water that is used in food production for the manufacture, processing, preservation or marketing of products or substances intended for human consumption).

The legislation therefore relates to the nature in which the water is being consumed for domestic purposes, not whether the building it serves is a commercial premises, or not.

It should be noted also that any property (including single domestic dwellings) where water served by a private supply that is providing rented

accommodation constitutes a Regulation 9 supply. This is because renting qualifies as a commercial activity under the Drinking Water Directive on the basis that landlords of such premises are obliged, under housing law, to provide a supply of wholesome water for domestic purposes.

Case study 14: Treatment requirements at a public building

In September 2014, the Inspectorate was contacted by a local authority for advice on the treatment of water supplying a wedding venue, which accommodates up to 250 guests. Since the premises, (a large converted country house) holds community functions, the supply constitutes a Regulation 9 supply, as a public building. The supply was not being treated at the time of the enquiry.

Although the water was not being used for drinking (bottled water was provided for this purpose), the supply nevertheless fell within the scope of Regulation 2(a) of the Private Water Supplies Regulations. It was being used for food preparation, toilet flushing and hand washing, as well as for showering in the accommodation provided for residential guests. The Drinking Water Directive requires water to be wholesome for domestic purposes and food production, and it is worth noting that food law also requires the use of wholesome water for the preparation of food.

The local authority audit monitoring of this supply revealed that it contained elevated levels of sodium, boron, chloride and fluoride:

Parameter	Initial sample	Resample
Boron	1.1mg/l	-
Chloride	330mg/l	330mg/l
Fluoride	4.6mg/l	4.2mg/l
Sodium	390mg/l	390mg/l

Failures of standards for sodium, fluoride and boron are not trivial and elevated chloride, while an indicator parameter, makes water aggressive to metals including stainless steel and may also lead to water to be unwholesome.

In response to the monitoring results, the local authority sought advice from Public Health England, to assist with their determination of the risk this posed. The local authority were informed that the only health concern was the ingestion of the water through drinking and food preparation and that showering/bathing and hand washing posed no health risk.

Since the water was being used to prepare food, the local authority advised the owner of the property to install a reverse osmosis (RO) treatment system to mitigate the particular risks posed by the elevated set

of parameters. However, the cost of an appropriately sized RO unit and the associated installation to remediate this risk was substantial and the owners were very concerned about the financial impact that this would have on their business.

The Inspectorate advised that under these circumstances RO is best used to treat a proportion of the water so that the treated water can then be used to blend the raw water in a tank so that all of the water then complies with the required standards. This means that a smaller sized RO unit could be used, and so reduce costs.

If the cheaper option of a point of use system is installed, the relevant persons must mitigate the risk of consumption (including food preparation) as a minimum. However, it would be a breach of the Drinking Water Directive to use the water for other domestic purposes in the context of *sanitary purposes (*washing/bathing/showering, laundry and toilet flushing), as defined in section 218 of the Water Industry Act.

The local authority accepted the advice of the Inspectorate and an action plan was developed and the risks mitigated.

This case study serves to remind local authorities that the provision of bottled water to consumers supplied by a private supply provides only a temporary restriction to mitigate risks from drinking the water. Furthermore, where the water is being consumed for other domestic purposes such as food preparation at the same premises, the water consumed must be wholesome and comply with the Regulations. In such situations where bottled water is provided for drinking, but a private supply is being used specifically for food preparation, breaches of food law must not be overlooked.

This case study also demonstrates that while the necessary treatment required to mitigate particular risks may be costly, alternative solutions, such as blending should be considered. This may have the advantage of lessening the financial burden on owners. However, where such arrangements are used to remediate risks, additional management and maintenance procedures may be required.

Chapter 4: Drinking water testing results

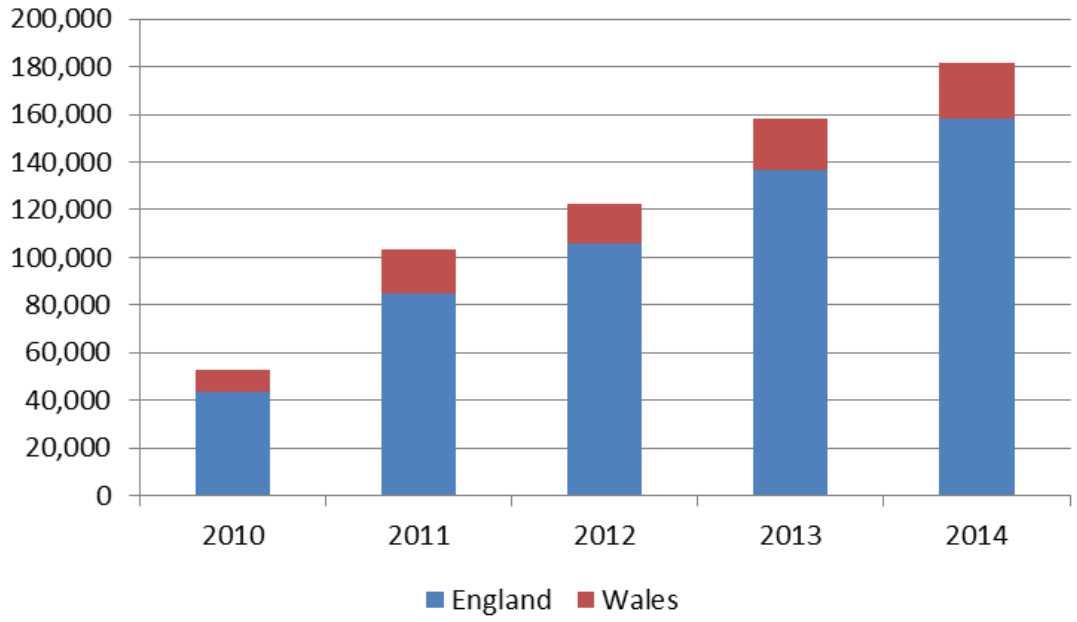
Chapter 4:

- Describes the progress of local authorities in providing test results.
- Provides details of audits by the Inspectorate of compliance with sample frequencies.
- Summarises the results of private supply testing.
- Reports on work by the Inspectorate and in providing an enquiry service to local authorities and private supply owners

4.1 Local authority progress in reporting test results

This chapter summarises the information provided by local authorities to the Inspectorate about the results of the testing of private water supplies. In total, for the calendar year of 2014, there were 18,884 test results submitted to the Inspectorate by local authorities and Figure 22 shows how this volume of test successfully transferred to the Inspectorate compares favourably to the situation in previous years

Figure 22: Numbers of test results provided to the Inspectorate 2010–2014



As can be seen from Annex 1, 243 local authorities have Regulation 9 private supplies in their area and 89% (217 local authorities) had in place the arrangements necessary to comply with this aspect of Regulation 13 (Schedule 4 Part 2 monitoring records). However, when making use of the summary information presented in Table 24a-d, it is important to be aware that this is not a complete picture of the quality of Regulation 9 supplies in 2014 because 24 local authorities (none in Wales) did not comply with the duty to provide this information to the Inspectorate by 31 January 2015.

It is also important to appreciate that whereas Regulation 9 supplies must be tested at least once a year, other types of private supply are tested less often. Small, shared domestic supplies (Regulation 10) only require testing once every five years and those serving a single household are not routinely tested. Accordingly, Tables 25-27 are a summary of all the test data provided by local authorities for these types of supply over a four year period (2011 – 2014). The data return containing 2010 was excluded as a number of data quality issues were identified with this data from the initial year of reporting. From the summary information in *Annex 1*, it can be seen that out 201 local authorities in England and Wales with Regulation 8 or Regulation 10 supplies in their area 71% (143) have provided test data to the Inspectorate. Out of the remaining local authorities 59 (3 in Wales) that should have provided monitoring returns for Regulation 8 and 10 supplies, but did not do so, there were only 11 (none in Wales) local authorities that also failed to provide the Inspectorate with monitoring data for their Regulation 9 supplies.

Compared to the position reported last year the Inspectorate is pleased to note an improvement in compliance by local authorities with this aspect of their Regulation 13 duties with 19 more local authorities providing Regulation 9 monitoring records and nine more local authorities providing monitoring records for Regulation 8 and 10 supplies. However, the Inspectorate is disappointed to report that nine local authorities (none in Wales) have not complied with this duty giving rise to an overall deficit of monitoring information in the national record for 837 private supplies of which 335 are Regulation 9 supplies. This missing data has national implications because the results from these supplies will not be included in the annual returns that the Inspectorate is required to provide to the European Union (EU) Commission.

4.2 Audit of test result reporting for Regulation 9 supplies

Shortfalls in monitoring of Regulation 9 supplies

In July 2014 the Inspectorate took action to understand the causes of non-compliance in respect of the provision of Regulation 9 supply monitoring records in the January 2014 returns. Eight local authorities with significant shortfalls (full Regulation 9 monitoring data not supplied to DWI) were contacted about the circumstances and the actions being taken to ensure that the deficit could be made good in the January 2015 annual returns. The findings in terms of the circumstances and corrective actions are summarised below:

- supplies misclassified as Regulation 9 supplies; errors to be corrected (1 local authority)
- sampling contractor not providing results; results to be obtained and reported (1 local authority)
- failing results only being recorded; all results to be recorded (1 local authority)
- sampling not being done; advice given because monitoring is not an optional duty (2 local authorities)
- short term lack of capacity to complete returns; future returns will be completed (2 local authorities)
- reluctant to assign resource to complete returns; advice given that Regulation 13 duty is not optional (1 local authority)

The audit had a positive outcome in so far as 7 of the 8 local authorities contacted by the Inspectorate went on to successfully provide monitoring records in their January 2015 return.

In respect of the January 2015 returns, most (88%) of the shortfall of monitoring data in the national record was due to just two English local authorities: West Somerset District Council (244 supplies of which 130 are Regulation 9 supplies) and Shropshire County Council (492 supplies of which 167 are Regulation 9 supplies). The remainder of the shortfall (101 supplies of which 38 are Regulation 9 supplies) was due to nine other English local authorities: Bury Metropolitan Borough Council, Cheltenham District Council, Dacorum District Council, Hyndburn Borough Council, Lewes District Council, Mid Sussex District Council, Mole Valley District Council, St Albans District Council, Tendring District Council. *Local authorities are reminded that they must comply with the duty in Regulation 13 to provide monitoring records each year going forward, and, where relevant, take steps in discussion with the Inspectorate to make good the shortfall in previous annual returns.*

Regulation 9 sampling frequency

In 2014 the Inspectorate commenced an audit of sampling frequencies based on the monitoring records for Regulation 9 supplies provided in the January 2013 returns. Sampling frequency is directly linked to the daily volume of water used by a private water supply with more samples being required as the volume used increases (e.g one sample a year for a volume of 10m^3 per day, four samples a year for a volume of 10,000m^3 per day and up to 12 samples a year for very large private supplies of 100,000m^3 per day). Therefore, to carry out this task the Inspectorate first had to rank supplies according to the volume information provided by local authorities. The preliminary exercise identified that too few samples were being collected from a large number of private supplies so inspectors then contacted local authorities responsible for the largest volume supplies to establish the reasons for the finding. The outcome of inspector's enquiries is summarised in Table 23:

Table 23: Causes of Sample Frequency Shortfalls

Reason for apparent shortfall in sample frequency for Regulation 9 supplies in 2013 annual return	**Number of large private supplies affected by each reason**
Reported volume figures were incorrect (too high)	40 (32 in one local authority)
Sampling had been carried out but by a third party and these results had not been entered by local authority into their annual return	8
Frequency of samples wrongly calculated	9
Nature of supply different from that set out in annual return (not a Regulation 9 supply)	6
Volume estimated on basis of temporary event population, rather than permanent resident population	1
Two local authorities failed to respond to emails and calls from the Inspectorate	

This preliminary exercise revealed that the volume information in local authority annual returns requires improvement to enable a meaningful audit of compliance with sample frequencies. Towards that end the exercise has raised awareness amongst the subset of local authorities reporting larger private supplies in their area about the sampling and data recording requirements that need to be met. To assist with learning, attention is drawn to the case study set out below. *All local authorities with private supplies on their record with a volume greater than 10 m^3 per day must take steps to verify that this information is correctly recorded, that the number of compliance samples being collected meets the minimum required by the regulations, and that the results of all such samples are included in annual returns to the Inspectorate.*

Case Study

The annual return for an English local authority recorded that a public building (comprising a globally recognised retail centre with restaurants) was served by a private supply with a daily use volume of up to 20m^3 per day however the return indicated that monitoring was not being carried out. When an inspector contacted the local authority it was found that the public building owner employed a contractor to manage the supply and this contractor was carrying out the monitoring. The monitoring comprised fortnightly samples for the check suite of parameters and biannual sampling for the audit suite of samples. Laboratory certificates for the results of these samples were being provided to the local authority and no failures had been reported. The inspector was satisfied that the sample frequency was being met and explained to the local authority that in order to demonstrate compliance by the local authority with Regulation 13, the contractor's results must be entered into the local authority annual return. Local authorities should be aware that a failure to report monitoring results for a public building is a breach not only of Regulation 13 but it is also a breach of the EU Drinking Water Directive, since the results of such monitoring must be included in the Inspectorate's UK return to the EU Commission.

4.3 Results of 2014 monitoring

In preparing Tables 24 to 27, it should be noted that when pooling data from local authorities, the Inspectorate checked for and corrected any simple errors (incorrect units, obvious input errors such as decimal point in the wrong place) to enable these results to be included in the report. Where the Inspectorate corrected data, the local authority was contacted, and the problem and changes explained and agreed. Some of the issues identified with annual returns were:

- Analytical sample results entered in the wrong units.
- Analytical results from years other than 2014 were on the return.
- There was inappropriate use of < (less than) symbols, for example, nickel reported as <20µg/l when the standard is 20µg/l. This is either a shortcut being used by local authorities to speed data entry (saying in effect the sample did not fail, or that the method is not sufficiently sensitive and that the limit of detection is at the same value as the standard.
- There was inappropriate use of > (greater than symbols) on chemical parameters.
- Analytical data for parameters not contained within the regulations

- Some analyses for taste and odour do not comply with the required method.
- Obvious typos.
- Poor correlation between samples flagged as failing with those actually failing the standard.

The drinking water standards in the private water supply regulations are the same as those that apply to public water supplies and most derive from the EU Drinking Water Directive. An explanation of the standards can be found in *Annex 5*. In the regulations[10], the standards are set out by parameter in Schedule 1. Four tables represent this schedule: Tables 24a–27a cover microbiological standards; Tables 24b-27b and 24c-27c set out the health-related chemical standards and the national standards while Tables 24d-27d cover the indicator parameters. For ease of reference, Tables 24-27 are set out following the Schedule 1 format and show the following information for each parameter: the standard or prescribed concentration; the total number of tests; the number of tests not meeting the standard or prescribed concentration; and the percentage of samples not meeting the standard or prescribed concentration.

When comparing the quality of different types of supply it can be seen from Tables 24a-27a that there are clear differences in microbiological quality. In England, 7.8% of samples from Regulation 9 supplies contained *E.coli*, whereas the failure rates for Regulation 10 supplies and single domestic dwellings is notably higher at 16.7% and 16.1% respectively. This pattern is verified by the figures for the other faecal indicator organism, Enterococci: Regulation 9 supplies (8.4%), Regulation 10 supplies (15.7%), and single domestic dwellings (15.5%).

Unsurprisingly, the quality of Regulation 8 supplies where the source of the supply originates from a water company main is of a far better microbiological quality with a much lower failure rate for *E.coli* (4.3%) and Enterococci (6.2%). Nonetheless these Regulation 8 supplies fall well short of the failure rate for public water supplies (*E.coli*, 0.017%; Enterococci 0.06%) confirming how management of piped supplies by a private person, rather than a licenced water company, poses a potential risk to health because such persons tend to lack essential knowledge about water supply hygiene and therefore maintenance practices are substandard. *This evidence about the faecal contamination of many small private supplies serving domestic premises (including those serving just a single premises) is compelling and its open publication strengthens considerably the case for regulatory intervention to mitigate the public*

[10] The Private Water Supplies Regulations 2009.

health risk. Local authorities are reminded about the importance of risk assessing all shared domestic supplies and providing risk management advice, in the form of Safe Water Packs, to all owners of single domestic premises reliant on a private supply in their area. An example of best practice, provided on the Inspectorate's website[11]*, is a simplified version of a pack developed by Wiltshire Council.*

When considering the appropriate risk mitigation following an *E.coli* or Enterococci failure in a sample taken from a tap in a property served by a private supply, local authorities should have regard to the turbidity result. Looking at *Annex 2*, for England and Wales overall, there were 13,828 samples tested for *E.coli,* but only 8,510 samples for turbidity, and an inspection of Tables 24b and 25b reveals this deficit in turbidity monitoring occurs in England in both Regulation 9 supplies (8,054 *E.coli* tests, but only 5,021 turbidity tests) and Regulation 10 supplies (6,993 *E.coli* tests, but only 4,022 turbidity tests). Disinfection of water can be compromised where the turbidity is >1NTU and this parameter gives useful information that can point to the cause and mitigation of microbiological failures. Specifically, such information should guide the need for questions to be asked about the adequacy of the servicing and maintenance of ultraviolet (UV) lamps and associated pre-filters. Water may also be turbid due to the presence of inorganic sediment containing substances like iron and manganese that interfere with disinfection. For example, the transmissivity of UV lamps is reduced because the lamp surface develops a coating, and chlorine or chlorine dioxide will be rapidly consumed and lost through reactions with these natural contaminants. *Local authorities are reminded that they should not be taking and testing samples just for microbiological parameters, instead turbidity and other indicators must also be tested for at the same time, as set out in the regulations.*

[11] http://dwi.defra.gov.uk/prvate-water-supply/Owner/info-pack.doc

England – Regulation 9 – 2014 data – numbers of tests and percentage not meeting the standard

Table 24a: Schedule 1 Table A – microbiological parameters

Parameter	Current standard or specified concentration	Total number of tests	Number of tests not meeting the standard or specification	Percentage of tests not meeting the standard
Escherichia coli (*E.coli*)	0/100ml	8,054	627	7.8
Enterococci	0/100ml	3,938	330	8.4

Table 24b: Schedule 1 Table B – chemical parameters

Parameter	Current standard or specified concentration	Total number of tests	Number of tests not meeting the standard or specification	Percentage of tests not meeting the standard
Antimony	5µg/l	630	-	-
Arsenic	10µg/l	1,292	36	2.8
Benzene	1µg/l	412	-	-
Benzo(a)pyrene	0.01µg/l	305	1	0.3
Boron	1mg/l	646	3	0.5
Bromate	10µg/l	509	6	1.2
Cadmium	5µg/l	824	-	-
Chromium	50µg/l	807	1	0.1
Copper	2mg/l	1,216	16	1.3
Cyanide	50µg/l	396	1	0.3
1-2 Dichloroethane	3µg/l	353	-	-
Fluoride	1.5mg/l	956	31	3.2
Lead	10µg/l	1,837	129	7.0
Mercury	1µg/l	417	-	-
Nickel	20µg/l	973	18	1.8
Nitrate	50µg/l	4,202	398	9.5
Nitrite – consumers' taps	0.5µg/l	2,618	9	0.3
Nitrite – treatment works	0.1µg/l	1,130	23	2.0
Pesticides				
Aldrin	0.03µg/l	324	1	0.3
Dieldrin	0.03µg/l	330	-	-
Heptachlor	0.03µg/l	328	-	-
Heptachlor Epoxide	0.03µg/l	304	-	-
Other pesticides	0.1µg/l	10,190	32	0.3
Total pesticides	0.5µg/l	275	-	-
Polycyclic aromatic hydrocarbons	0.1µg/l	206	3	1.5
Selenium	10µg/l	640	2	0.3
Trichloroethene & tetrachloroethene	10µg/l	314	5	1.6
Trihalomethanes	100µg/l	252	2	0.8
*Standards are not set for all disinfection by-products.				

England – Regulation 9 – 2014 data – numbers of tests and percentage not meeting the standard

Table 24c: Schedule 1 Table B – national requirements

Parameter	Current standard or specified concentration	Total number of tests	Number of tests not meeting the standard or specification	Percentage of tests not meeting the standard
Aluminium	200µg/l	3,320	71	2.1
Colour	20mg/l Pt/Co	4,393	61	1.4
Iron	200µg/l	4,226	324	7.7
Manganese	50µg/l	4,114	319	7.8
Odour	No abnormal change	3,662	210	5.7
Sodium	200mg/l	817	27	3.3
Taste	No abnormal change	3,005	116	3.9
Tetrachloromethane	3µg/l	338	-	-
Turbidity	4NTU	5,021	106	2.1

Table 24d: Schedule 1 Table C – indicator parameters

Parameter	Current standard or specified concentration	Total number of tests	Number of tests not meeting the standard or specification	Percentage of tests not meeting the standard
Ammonium	0.5mg/l	4,448	117	2.6
Chloride	250mg/l	516	8	1.6
Clostridium perfringens	0/100ml	3,666	281	7.7
Coliform bacteria (indicator)	0/100ml	7,933	1,303	16.4
Colony Counts After 3 Days At 22°c	No abnormal change	6,162	-	-
Colony Counts After 48 Hours At 37°c	No abnormal change	6,075	-	-
Conductivity	2500µS/cm	5,106	6	0.1
Hydrogen ion (pH) (indicator)	6.5 – 9.5	5,776	580	10.0
Sulphate	250mg/l	568	21	3.7
Total indicative dose	mSv/year	9	-	-
Total organic carbon	No abnormal change	234	-	-
Tritium	100Bq/l	68	-	-
Turbidity (at treatment works)	1NTU	801	67	8.4

England – Regulation 10 – 4 year data (2011–2014) – numbers of tests and percentage not meeting the standard

Table 25a: Schedule 1 Table A – microbiological parameters

Parameter	Current standard or specified concentration	Total number of tests	Number of tests not meeting the standard or specification	Percentage of tests not meeting the standard
Escherichia coli (*E.coli*)	0/100ml	6,993	1,165	16.7
Enterococci	0/100ml	5,085	796	15.7

Table 25b: Schedule 1 Table B – chemical parameters

Parameter	Current standard or specified concentration	Total number of tests	Number of tests not meeting the standard or specification	Percentage of tests not meeting the standard
Antimony	5µg/l	193	1	0.5
Arsenic	10µg/l	551	21	3.8
Benzene	1µg/l	63	-	-
Benzo(a)pyrene	0.01µg/l	52	-	-
Boron	1mg/l	182	5	2.7
Bromate	10µg/l	77	1	1.3
Cadmium	5µg/l	291	1	0.3
Chromium	50µg/l	249	-	-
Copper	2mg/l	1,021	60	5.9
Cyanide	50µg/l	54	-	-
1-2 Dichloroethane	3µg/l	45	-	-
Fluoride	1.5mg/l	232	5	2.2
Lead	10µg/l	1,501	164	10.9
Mercury	1µg/l	74	1	1.4
Nickel	20µg/l	360	30	8.3
Nitrate	50µg/l	3,157	509	16.1
Nitrite – consumers' taps	0.5µg/l	2,240	67	3.0
Nitrite – treatment works	0.1µg/l	406	49	12.1
Pesticides				
Aldrin	0.03µg/l	12	-	-
Dieldrin	0.03µg/l	54	-	-
Heptachlor	0.03µg/l	56	-	-
Heptachlor Epoxide	0.03µg/l	55	-	-
Other pesticides	0.1µg/l	1,575	11	0.7
Total pesticides	0.5µg/l	55	-	-
Polycyclic aromatic hydrocarbons	0.1µg/l	40	1	2.5
Selenium	10µg/l	180	1	0.6
Trichloroethene & Tetrachloroethene	10µg/l	54	-	-
Trihalomethanes	100µg/l	55	-	-
*Standards are not set for all disinfection by-products.				

England – Regulation 10 – 4 year data (2011–2014) – numbers of tests and percentage not meeting the standard

Table 25c: Schedule 1 Table B – national requirements

Parameter	Current standard or specified concentration	Total number of tests	Number of tests not meeting the standard or specification	Percentage of tests not meeting the standard
Aluminium	200µg/l	1,765	80	5.1
Colour	20mg/l Pt/Co	1,958	86	4.4
Iron	200µg/l	2,743	296	10.8
Manganese	50µg/l	2,648	332	12.5
Odour	No abnormal change	1,801	270	15.0
Sodium	200mg/l	283	14	4.9
Taste	No abnormal change	1,220	197	16.1
Tetrachloromethane	3µg/l	50	-	-
Turbidity	4NTU	4,022	225	5.6

Table 25d: Schedule 1 Table C – indicator parameters

Parameter	Current standard or specified concentration	Total number of tests	Number of tests not meeting the standard or specification	Percentage of tests not meeting the standard
Ammonium	0.5mg/l	2,085	63	3.0
Chloride	250mg/l	271	4	1.5
Clostridium perfringens	0/100ml	2,230	283	12.7
Coliform bacteria (indicator)	0/100ml	6,257	1,995	31.9
Colony Counts After 3 Days At 22°c	No abnormal change	2,846	-	-
Colony Counts After 48 Hours At 37°c	No abnormal change	2,887	-	-
Conductivity	2500µS/cm	4,597	82	1.8
Hydrogen ion (pH) (indicator)	6.5 – 9.5	4,649	681	14.6
Sulphate	250mg/l	293	12	4.1
Total indicative dose	mSv/year	1	-	-
Total organic carbon	No abnormal change	145	-	-
Tritium	100Bq/l	6	-	-
Turbidity (at treatment works)	1NTU	590	42	7.1

England – Single Domestic Dwellings – 4 year data (2011–2014) – numbers of tests and percentage not meeting the standard

Table 26a: Schedule 1 Table A – microbiological parameters

Parameter	Current standard or specified concentration	Total number of tests	Number of tests not meeting the standard or specification	Percentage of tests not meeting the standard
Escherichia coli (*E.coli*)	0/100ml	2,763	445	16.1
Enterococci	0/100ml	1,729	268	15.5

Table 26b: Schedule 1 Table B – chemical parameters

Parameter	Current standard or specified concentration	Total number of tests	Number of tests not meeting the standard or specification	Percentage of tests not meeting the standard
Antimony	5µg/l	58	1	1.7
Arsenic	10µg/l	249	14	5.6
Benzene	1µg/l	35	-	-
Benzo(a)pyrene	0.01µg/l	28	-	-
Boron	1mg/l	61	10	16.4
Bromate	10µg/l	42	1	2.4
Cadmium	5µg/l	116	3	2.6
Chromium	50µg/l	95	-	-
Copper	2mg/l	516	23	4.5
Cyanide	50µg/l	31	-	-
1-2 Dichloroethane	3µg/l	29	-	-
Fluoride	1.5mg/l	122	2	1.6
Lead	10µg/l	712	55	7.7
Mercury	1µg/l	35	-	-
Nickel	20µg/l	136	8	5.9
Nitrate	50µg/l	1,250	166	13.3
Nitrite – consumers' taps	0.5µg/l	914	25	2.7
Nitrite – treatment works	0.1µg/l	204	10	4.9
Pesticides				
Aldrin	0.03µg/l	24	-	-
Dieldrin	0.03µg/l	24	-	-
Heptachlor	0.03µg/l	24	-	-
Heptachlor Epoxide	0.03µg/l	23	-	-
Other pesticides	0.1µg/l	709	1	0.1
Total pesticides	0.5µg/l	25	1	4.0
Polycyclic aromatic hydrocarbons	0.1µg/l	20	-	-
Selenium	10µg/l	59	-	-
Trichloroethene & tetrachloroethene	10µg/l	25	-	-
Trihalomethanes	100µg/l	20	-	-
*Standards are not set for all disinfection by-products.				

England – Single Domestic Dwellings – 4 year data (2011–2014) – numbers of tests and percentage not meeting the standard

Table 26c: Schedule 1 Table B – national requirements

Parameter	Current standard or specified concentration	Total number of tests	Number of tests not meeting the standard or specification	Percentage of tests not meeting the standard
Aluminium	200µg/l	825	38	4.6
Colour	20mg/l Pt/Co	900	30	3.3
Iron	200µg/l	1,346	159	11.8
Manganese	50µg/l	1,351	236	17.5
Odour	No abnormal change	828	170	20.5
Sodium	200mg/l	125	7	5.6
Taste	No abnormal change	636	120	18.9
Tetrachloromethane	3µg/l	25	-	-
Turbidity	4NTU	1,485	109	7.3

Table 26d: Schedule 1 Table C – indicator parameters

Parameter	Current standard or specified concentration	Total number of tests	Number of tests not meeting the standard or specification	Percentage of tests not meeting the standard
Ammonium	0.5mg/l	1034	31	3.0
Chloride	250mg/l	105	4	3.8
Clostridium perfringens	0/100ml	910	107	11.8
Coliform bacteria (indicator)	0/100ml	2,582	722	28.0
Colony Counts After 3 Days At 22°c	No abnormal change	1,198	-	-
Colony Counts After 48 Hours At 37°c	No abnormal change	1,205	-	-
Conductivity	2500µS/cm	1,816	33	1.8
Hydrogen ion (pH) (indicator)	6.5 – 9.5	1,859	281	15.1
Sulphate	250mg/l	96	5	5.2
Total indicative dose	mSv/year	5	1	20.0
Total organic carbon	No abnormal change	27	-	-
Tritium	100Bq/l	9	-	-
Turbidity (at treatment works)	1NTU	337	64	19.0

England – Regulation 8 – 4 year data (2011–2014) – numbers of tests and percentage not meeting the standard

Table 27a: Schedule 1 Table A – microbiological parameters

Parameter	Current standard or specified concentration	Total number of tests	Number of tests not meeting the standard or specification	Percentage of tests not meeting the standard
Escherichia coli (*E.coli*)	0/100ml	2,165	93	4.3
Enterococci	0/100ml	756	47	6.2

Table 27b: Schedule 1 Table B – chemical parameters

Parameter	Current standard or specified concentration	Total number of tests	Number of tests not meeting the standard or specification	Percentage of tests not meeting the standard
Antimony	5µg/l	61	4	6.6
Arsenic	10µg/l	87	3	3.4
Benzene	1µg/l	61	-	-
Benzo(a)pyrene	0.01µg/l	66	8	12.1
Boron	1mg/l	60	8	13.3
Bromate	10µg/l	99	-	-
Cadmium	5µg/l	91	9	9.9
Chromium	50µg/l	62	-	-
Copper	2mg/l	152	4	2.6
Cyanide	50µg/l	53	2	3.8
1-2 Dichloroethane	3µg/l	89	-	-
Fluoride	1.5mg/l	86	1	1.2
Lead	10µg/l	210	16	7.6
Mercury	1µg/l	59	2	3.4
Nickel	20µg/l	131	4	3.1
Nitrate	50µg/l	467	15	3.2
Nitrite – consumers' taps	0.5µg/l	281	9	3.2
Nitrite – treatment works	0.1µg/l	150	3	2.0
Pesticides				
Aldrin	0.03µg/l	47	-	-
Dieldrin	0.03µg/l	47	-	-
Heptachlor	0.03µg/l	38	-	-
Heptachlor Epoxide	0.03µg/l	47	1	2.1
Other pesticides	0.1µg/l	1,604	51	3.2
Total pesticides	0.5µg/l	49	1	2.0
Polycyclic aromatic hydrocarbons	0.1µg/l	35	1	2.9
Selenium	10µg/l	57	-	-
Trichloroethene & tetrachloroethene	10µg/l	61	1	1.6
Trihalomethanes	100µg/l	53	2	3.8
*Standards are not set for all disinfection by-products.				

England – Reg 8 – 4 year data – numbers of tests and percentage not meeting the standard

Table 27c: Schedule 1 Table B – national requirements

Parameter	Current standard or specified concentration	Total number of tests	Number of tests not meeting the standard or specification	Percentage of tests not meeting the standard
Aluminium	200µg/l	921	26	2.8
Colour	20mg/l Pt/Co	268	6	2.2
Iron	200µg/l	1,128	61	5.4
Manganese	50µg/l	957	62	6.5
Odour	No abnormal change	312	53	17.0
Sodium	200mg/l	402	64	15.9
Taste	No abnormal change	264	38	14.4
Tetrachloromethane	3µg/l	73	7	9.6
Turbidity	4NTU	958	35	3.7

Table 27d: Schedule 1 Table C – indicator parameters

Parameter	Current standard or specified concentration	Total number of tests	Number of tests not meeting the standard or specification	Percentage of tests not meeting the standard
Ammonium	0.5mg/l	502	33	6.6
Chloride	250mg/l	354	23	6.5
Clostridium perfringens	0/100ml	252	17	6.7
Coliform bacteria (indicator)	0/100ml	2,111	96	4.5
Colony Counts After 3 Days At 22°c	No abnormal change	1,700	-	-
Colony Counts After 48 Hours At 37°c	No abnormal change	1,686	-	-
Conductivity	2500µS/cm	1,190	106	8.9
Hydrogen ion (pH) (indicator)	6.5 – 9.5	1,203	50	4.2
Sulphate	250mg/l	363	32	8.8
Total indicative dose	mSv/year	1	-	-
Total organic carbon	No abnormal change	41	-	-
Tritium	100Bq/l	35	-	-
Turbidity (at treatment works)	1NTU	380	11	2.9

The results in Annex 2 demonstrate the extent of non-compliance of private water supplies with the health-related chemical standards, national standards and indicator parameters, with 5,079 failures of 32 parameters being recorded in 2014. The majority of failures of health related chemical standards associated with Regulation 9 supplies in England were due to nitrate (56%) and lead (18%). *Local authorities are reminded for Regulation 9 supplies it is mandatory to serve a notice requiring the relevant person to put in place a permanent remedy and in the case of plumbing metals this will usually mean replacement of pipework through to the taps where the water is drawn off for use. A Notice advising only that the water is not to be used for drinking or food preparation for young children does not constitute a permanent remedy. The Inspectorate will be carrying out an audit in 2015 to assess the extent to which failing private supplies identified since 2010 have been remediated.*

The results of testing in 2014 show the extent to which private supplies in England and Wales are being affected by pesticide use in the local catchment. Annex 2.1 summarises sample numbers and failures of the standard for pesticides detected. A total of 32 different pesticides have been detected, of which 12 are currently approved for use in the UK. When a local authority becomes aware of pesticides in a private water supply this must be notified to the Environment Agency, the competent authority for controlling the use of pesticides where this is impacting adversely on ground or surface water that is abstracted for use for drinking water. *Local authorities must also notify the Environment Agency of failures of the nitrate standard and any other substance that is not a naturally arising as a consequence of the local geology. Unless told, the Environment Agency is not able to ensure compliance with Article 7 of the Water Framework Directive (and relevant national regulations), the purpose of which is to protect (and if needs be remediate) water bodies used to provide a supply of water for domestic purposes. Local authorities will find more information on these matters in the public supply sections of Drinking water 2014*

Annex 4 shows how the enquiry rate initially increased in 2011. This coincided with the publication of Drinking water 2010, the first ever report on the quality of private supplies in England, which made transparent the poor quality of private supplies and explained the new regulations that were being implemented to address the issue. However, 2014 saw the greatest number of enquiries to the Inspectorate and the nature of the enquiries received during 2014 has changed with most now being about specific failing private supplies or interpretation of risk assessments and sample results or disputes between relevant persons or appeals relating to the content of notices. The scope of this aspect of the Inspectorate's work is reflected in the risk management case studies published in Chapter 3.

Annex 1 – Numbers of supplies, risk assessments and evidence of monitoring and enforcement.

ENGLAND and WALES Council name **Note** **Councils marked with a * did not make a valid return or returned too late to have their data incorporated in 2014 so the latest available data has been used.** **Where ** is indicated against the estimate of the % of the LA population on the supply, LAs have not provided population data so an estimate has been made on the basis of the volumes supplied.**	Total regulated supplies	Single domestic dwellings	Further distribution of mains water by someone other than a licensed water supplier (Reg 8)	Large supplies and any size supply used in a public building or a commercial activity (Reg 9)	Small, shared domestic supplies (Reg 10)	% risk assessments completed for Reg 9 supplies	% risk assessments completed for Regulation 8 and 10 supplies	Evidence of monitoring of Reg 9 supplies provided?	Evidence of monitoring of Reg 8 and Reg 10 supplies provided?	Evidence of having served Regulation 18 or Section 80 notices?	Estimate of percentage of LA population on a private supply
Adur District Council	3	0		1	2	100	100	Y	Y		0.07
Allerdale Borough Council	267	102		124	41	44	0	Y	Y	Y	5.59
Amber Valley Borough Council	61	44	1	8	8	100	44	Y	Y		0.26
Arun District Council	13	6		3	4	100	100	Y	Y	Y	0.19
Ashfield District Council	3	1			2	N/A	100	N/A	N		<0.01
Ashford Borough Council	7	6			1	N/A	100	N/A	N		0.02
Aylesbury Vale District Council	33	23		6	4	67	100	Y	Y		0.76
Babergh District Council	147	107		16	24	100	96	Y	Y		1.80
Barking and Dagenham Borough Council	1	0		1		100		Y	N/A		<0.01
Barnet Borough Council	1	0		1		100		Y	N/A		0.18
Barnsley Borough Council	40	31		4	5	100	100	Y	Y		0.04
Barrow-in-Furness Borough Council	3	2		1		100		Y	N/A	Y	0.01
Basingstoke & Deane Borough Council	100	41		17	42	100	100	Y	Y	Y	1.03

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Bassetlaw Borough Council	25	11		11	3	100	100	Y	Y		4.70
Bath & North East Somerset District Council	85	60		4	21	100	100	Y	Y	Y	0.16
Bedford Borough Council	12	9		2	1	100	100	Y	N		0.09
Birmingham City Council	7	3		4		100	N/A	Y	N/A		0.11
Blaby District Council	8	7			1	N/A	0	N/A	N		0.03
Blackburn with Darwen Borough Council	89	65		2	22	100	100	Y	Y	Y	0.15
Blackpool Borough Council	2	0		2		0	N/A	N	N/A		<0.01
Blaenau Gwent County Borough Council	31	27		4		100	N/A	Y	N/A		0.14
Bolsover District Council	1	0			1	N/A	100	N/A	N		0.03
Bolton Metropolitan Borough Council	31	13		1	17	0	100	N	Y	Y	0.13
Bradford Metropolitan District Council	324	125		45	154	100	25	Y	Y		0.74
Braintree District Council	186	135		8	43	88	2	Y	Y	Y	0.56
*Breckland District Council – 2011 data	762	567		54	141	81	11	Y	Y	Y	0.98
Brentwood Borough Council	3	3				N/A	N/A	N/A	N/A		0.04
Bridgend County Borough Council	77	71		5	1	100	100	Y	Y		0.23

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Brighton & Hove City Council	2	1		1		100	N/A	N	N/A	Y	1.09
Broadland District Council	584	428		60	96	93	86	Y	Y		3.15
Bromley (London Borough of)	11	8		3		100	N/A	Y	N/A	Y	0.07
Bromsgrove District Council	29	22		1	6	100	17	Y	Y	Y	0.15
Broxbourne Borough Council	2	2				N/A	N/A	N/A	N/A		0.01
Broxtowe Borough Council	3	1			2	N/A	100	N/A	N		0.01
Burnley Borough Council	52	39			13	N/A	100	N/A	N		0.22
Bury Metropolitan Borough Council	67	44	4	7	12	57	63	N	N		1.03
Caerphilly County Borough Council	71	56		6	9	100	100	Y	N		0.10
Calderdale Metropolitan Borough Council	782	509		44	229	91	44	Y	Y		4.06
Canterbury City Council	5	4			1	N/A	100	N/A	Y		0.01
Cardiff Council	24	17		2	5	100	100	Y	N		0.06
Carlisle City Council	109	88	1	18	2	78	67	Y	Y		1.23
Carmarthenshire County Council	2,339	2,270	4	55	10	96	57	Y	Y	Y	3.83

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Central Bedfordshire Council	28	19		8	1	88	100	Y	N	Y	0.60
Ceredigion County Council	1,419	1,259		73	87	100	100	Y	Y	Y	11.88
Charnwood Borough Council	19	14		1	4	100	100	Y	Y	Y	0.03
Chelmsford Borough Council	17	11	1	3	2	100	100	Y	Y		0.03
Cheltenham Borough Council	21	17		1	3	0	100	N	N		0.08
Cherwell District Council	148	112	1	11	24	100	88	Y	Y		0.33
Cheshire East Council	441	374		49	18	86	61	Y	Y	Y	0.33
Cheshire West & Chester Council	65	36		15	14	93	93	Y	Y		1.00
Chichester District Council	66	25	4	8	29	100	88	Y	Y	Y	1.74
Chiltern District Council	20	15		2	3	100	100	Y	Y		0.16
Chorley Borough Council	18	15		1	2	100	0	Y	N		0.77
City of London	4			4		100	N/A	Y	N/A		N/A
Colchester Borough Council	44	40		2	2	100	100	Y	N		0.23
Conwy County Borough Council	519	418		77	24	91	100	Y	Y	Y	3.80
Copeland Borough Council	221	140		53	28	81	25	Y	Y	Y	18.33

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Cornwall Council	3,811	2,462		816	533	11	2	Y	Y		5.25
Cotswold District Council	236	87	2	129	18	98	100	Y	Y	Y	6.31
Coventry City Council	1			1		100	N/A	Y	N/A		<0.01
Craven District Council	735	369		195	171	91	71	Y	Y	Y	20.55
Dacorum Borough Council	37	21	6	7	3	86	89	N	N		0.32
Darlington Borough Council	4			4		100	N/A	Y	N/A		1.30
Daventry District Council	78	58	4	1	15	100	37	N	Y		0.50
Denbighshire County Council	662	476		99	87	95	77	Y	Y	Y	3.03
Derbyshire Dales District Council	227	160		36	31	100	52	Y	Y	Y	5.54
Doncaster Metropolitan Borough Council	27	11	4	12		50	0	Y	N		0.27
Dover District Council	3	3				N/A	N/A	N/A	N/A		0.01
Dudley Metropolitan Borough Council	2	2				N/A	N/A	N/A	N/A		<0.01
Durham County Council	257	214		18	25	94	80	Y	Y		0.14
East Cambridgeshire District Council	35	23	1	10	1	100	100	N	Y		0.29

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East Devon District Council	739	446		154	139	93	95	Y	Y	Y	4.57
East Dorset District Council	46	23		8	15	100	80	Y	Y		0.24
East Hampshire District Council	54	36	1	9	8	100	89	Y	Y		5.18
East Hertfordshire Council	133	92		14	27	29	0	Y	N		1.53
East Lindsey District Council	191	150	2	15	24	60	8	Y	N		3.11
East Northamptonshire District Council	25	16		4	5	50	20	Y	Y		0.25
East Riding of Yorkshire Council	170	127		21	22	100	100	Y	Y	Y	0.39
East Staffordshire Borough Council	19	11		8		100	N/A	Y	N/A		0.63
Eastleigh Borough Council	2	2				N/A	N/A	N/A	N/A		<0.01
Eden District Council	574	258		117	199	100	100	Y	Y		3.13
Elmbridge Borough Council	10	10				N/A	N/A	N/A	N/A		0.01
Enfield (London Borough of)	4	1		2	1	100	100	Y	Y		0.01
Epping Forest District Council	51	32		9	10	22	40	Y	N		0.29
Epsom and Ewell Borough Council	1	1				N/A	N/A	N/A	N/A		<0.01
Erewash Borough Council	1	1				N/A	N/A	N/A	N/A		<0.01

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Exeter City Council	1			1		100	N/A	Y	N/A		<0.01
Fareham Borough Council	1			1		100	N/A	Y	N/A		0.01
Flintshire County Council	90	84		6		100	N/A	Y	N/A		0.16
Forest Heath District Council	46	20		13	13	100	100	Y	Y		12.12
Forest of Dean District Council	65	41		14	10	93	20	Y	Y	Y	0.05
Fylde Borough Council	2	1		1		100	N/A	Y	N/A		2.63
Gateshead Metropolitan Borough Council	1	1				N/A	N/A	N/A	N/A		<0.01
Gedling Borough Council	14	12		1	1	100	100	Y	Y		0.40
Gravesham Borough Council	4	3		1		100	N/A	Y	N/A		0.01
Great Yarmouth Borough Council	53	44		5	4	100	100	Y	Y		0.89
Guildford Borough Council	8	6		1	1	0	0	Y	Y		0.09
Gwynedd County Council	614	300	2	274	38	66	5	Y	Y	Y	10.18
Hackney (London Borough of)	1				1	N/A	0	N/A	N		<0.01
Halton Borough Council	2	1		1		0	N/A	Y	N/A		<0.01

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Hambleton District Council	267	170		29	68	100	15	Y	Y	Y	1.96
Hammersmith and Fulham	1			1		0	N/A	Y	N/A		1.95
Harborough District Council	42	27		5	10	100	100	Y	Y		0.19
Harlow District Council	1			1		100	N/A	Y	N/A		0.02
Harrogate Borough Council	598	342		111	145	95	54	Y	Y		12.44
Hart District Council	11	6	3	2		100	0	Y	N		0.13
Hartlepool Borough Council	1			1		100	N/A	Y	N/A		<0.01
Herefordshire Council	2,493	2,101		296	96	94	85	Y	Y	Y	5.82
Hertsmere Borough Council	7	3		4		100	57	Y	Y		4.62
High Peak Borough Council	284	227		20	37	100	N/A	Y	N/A		2.22
Hillingdon (London Borough of)	1			1		100	N/A	N	N/A		0.27
Hinckley and Bosworth Borough Council	57	52	4		1	N/A	60	N/A	N		0.15
Horsham District Council	20	13		7		100	N/A	Y	N/A		0.10
Huntingdonshire District Council	10	8		2		100	N/A	Y	N/A		<0.01
Hyndburn Borough Council	36	30		2	4	50	0	N	N		0.19

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Ipswich Borough Council	3	1		2		100	N/A	N	N/A		<0.01
Isle of Anglesey County Council	203	168		24	11	100	64	Y	Y	Y	0.04
Isle of Wight Council	20	15		3	2	67	50	Y	Y	Y	0.09
Kensington and Chelsea (Royal Borough of)	3			3		100	N/A	Y	N/A		4.36
Kettering Borough Council	2	1		1		100	N/A	N	N/A		<0.01
King's Lynn and West Norfolk Borough Council	76	46		14	16	100	25	Y	Y	Y	0.32
Kirklees Council	236	164		17	55	100	100	Y	Y		0.67
Knowsley Metropolitan Borough Council	2			2		100	N/A	Y	N/A		<0.01
Lancaster City Council	192	120		42	30	40	73	Y	Y	Y	1.22
Leeds City Council	46	16		20	10	100	100	Y	Y		0.22
Lewes District Council	14	2		9	3	100	100	N	N		1.10
Lichfield District Council	11	7		4		100	N/A	Y	N/A		0.10
Liverpool City Council	1			1		100	N/A	N	N/A		<0.01

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Maidstone Borough Council	14	8		6		33	N/A	Y	N/A		0.04
Maldon District Council	22	15		2	5	100	80	Y	N		0.25
Malvern Hills District Council	228	205		12	11	92	18	Y	Y	Y	0.90
Manchester City Council	5			5		20	N/A	Y	N/A		0.13
Medway Council	1		1			N/A	100	N/A	Y		<0.01
Melton Borough Council	15	7		8		100	N/A	Y	N/A	Y	1.10
Mendip District Council	144	76	2	28	38	93	93	Y	Y	Y	1.81
Merthyr Tydfil County Borough Council	15	14		1		100	N/A	Y	N/A		0.08
Mid Devon District Council	1,298	1,014		119	165	43	13	Y	Y	Y	10.33
Mid Suffolk District Council	113	80		15	18	93	100	Y	Y		2.33
Mid Sussex District Council	4	2		1	1	100	0	N	N		0.03
Milton Keynes Council	10	8		1	1	100	100	Y	N		0.04
Mole Valley District Council	7	3		1	3	100	100	N	N		0.05
Monmouthshire County Council	642	484		51	107	88	80	Y	Y		3.40

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Neath Port Talbot County Borough Council	178	161		8	9	100	100	Y	Y		0.58
New Forest District Council	35	25		1	9	100	100	Y	Y		0.20
Newark and Sherwood District Council	14	12	1	1		100	100	Y	N		0.06
Newcastle-under-Lyme Borough Council	30	22			8	N/A	100	N/A	Y	Y	0.05
Newport City Council	37	25		3	9	100	100	Y	Y		0.18
North Devon District Council	1,124	835	3	188	98	97	43	Y	Y	Y	11.87
North Dorset District Council	78	31		16	31	100	100	Y	Y	Y	1.34
North East Derbyshire District Council	151	107		15	29	60	0	Y	N		0.63
North East Lincolnshire Council	43	34		7	2	100	100	Y	Y	Y	4.44
North Hertfordshire District Council	58	31		7	20	100	100	Y	Y		0.37
North Kesteven District Council	13	6		4	3	100	67	Y	N		<0.01
North Lincolnshire Council	20	11		5	4	100	100	Y	N		0.16
North Norfolk District Council	406	264		80	62	25	2	Y	Y	Y	11.54
North Somerset District Council	13	6	3	3	1	100	50	Y	Y		0.03

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North Warwickshire Borough Council	20	10		8	2	100	50	Y	N		0.28
Northumberland County Council	1,054	438		229	387	96	11	Y	Y	Y	1.78
Norwich City Council	4	1		3		100	N/A	Y	N/A		0.34
Nottingham City Council	2			2		100	N/A	Y	N/A		<0.01
North West Leicestershire District Council	18	10	2	2	4	50	0	Y	Y	Y	0.16
Oldham Metropolitan Borough Council	188	148		10	30	90	90	Y	Y		0.37
Pembrokeshire County Council	958	843	2	79	34	97	86	Y	Y	Y	8.20
Pendle Borough Council	276	198		14	64	100	92	Y	Y	Y	2.35
Peterborough City Council	10	4		3	3	67	100	Y	N	Y	0.05
Powys County Council	6,051	5,207		295	549	92	87	Y	Y	Y	18.01
Preston City Council	15	6		2	7	100	100	Y	N		0.09
Purbeck District Council	57	36		14	7	93	43	Y	Y	Y	1.93
Reading Borough Council	11	8		2	1	100	100	Y	N		3.23
Redcar & Cleveland Borough Council	41	21	1	4	15	100	75	Y	Y		0.33

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Redditch Borough Council	4	4				N/A	N/A	N/A	N/A		0.02
Reigate and Banstead Borough Council	1	1				N/A	N/A	N/A	N/A		<0.01
Rhondda Cynon Taff County Borough Council	90	69		7	14	100	86	Y	Y	Y	0.42
Ribble Valley Borough Council	300	180		37	83	97	37	Y	Y	Y	8.93
Richmondshire District Council	444	274		69	101	100	13	Y	Y	Y	7.23
Rochdale Metropolitan Borough Council	214	200		14		100	22	Y	Y	Y	0.27
Rochford District Council	1		1			N/A	0	N/A	N		0.12
Rossendale Borough Council	473	262		11	200	73	0	Y	N		1.96
Rother District Council	24	17		5	2	100	0	Y	N		0.51
Rotherham Metropolitan Borough Council	3			3		100	N/A	Y	N/A		<0.01
Rugby Borough Council	19	19				N/A	N/A	N/A	N/A		0.05
Runnymede Borough Council	9	5	2	2		100	50	Y	N/A		0.02
Rushcliffe Borough Council	4	2	1		1	N/A	50	N/A	N		0.04

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Rushmoor Borough Council	2		2			N/A	50	N/A	Y		10.92
Rutland County Council	24	15	1	2	6	100	100	Y	Y		0.68
Ryedale District Council	270	155		50	65	100	9	Y	Y		11.32
Salford City Council	2	1		1		100	N/A	Y	N/A		<0.01
Scarborough Borough Council	321	194		67	60	100	100	Y	Y	Y	2.97
Sedgmoor District Council	15	5		10		100	N/A	Y	N/A	Y	0.03
*Selby District Council – 2013 data	39	14		7	10	43	18	Y	N	Y	0.36
Sevenoaks District Council	12	4		5	3	100	100	Y	N		0.42
Sheffield City Council	164	160		4		100	N/A	Y	N/A	Y	0.02
Shepway District Council	3	2			1	N/A	100	N/A	N		0.01
Shropshire Council	2,096	1,604	1	167	324	47	4	N	N		3.13
Slough Borough Council	2			2		100	N/A	N	N/A		<0.01
Solihull Metropolitan Borough Council	18	15		3		100	N/A	Y	N/A		0.02
South Buckinghamshire District Council	7	4		3		100	N/A	N	N/A		5.00
South Cambridgeshire District Council	138	108		7	23	71	0	Y	N	Y	2.15

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South Derbyshire District Council	33	13		14	6	0	0	Y	N		0.13
South Gloucestershire Council	53	32	6	9	6	89	100	Y	Y	Y	0.07
South Hams District Council	805	529		138	138	62	14	Y	Y	Y	10.42
South Holland District Council	8	7			1	N/A	100	N/A	Y		0.02
South Kesteven District Council	50	34		3	13	100	100	Y	Y	Y	0.13
South Lakeland District Council	1,717	1,040	3	420	254	30	1	Y	Y	Y	16.25
South Norfolk Council	273	196		23	54	100	100	Y	Y	Y	1.73
South Northamptonshire Council	47	27		13	7	100	100	Y	Y	Y	0.47
South Oxfordshire District Council	146	108	1	29	8	100	78	Y	Y	Y	1.24
South Ribble Borough Council	6	4		2		100	N/A	Y	N/A		0.43
South Somerset District Council	429	325		28	76	100	100	Y	Y		2.64
South Staffordshire District Council	55	43		4	8	100	100	Y	Y		0.19
South Tyneside Metropolitan Borough Council	1	1				N/A	N/A	N/A	N/A		<0.01
Spelthorne Borough Council	1			1		100	N/A	Y	N/A		0.05

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St Albans District Council	56	47		2	7	0	0	N	N		0.15
St Edmundsbury Borough Council	91	64		14	13	93	77	Y	Y	Y	22.18
Stafford Borough Council	121	94		9	18	89	22	Y	Y		0.85
Staffordshire Moorlands District Council	418	358		22	38	100	39	Y	Y		20.95
Stockport Metropolitan Borough Council	40	30		3	7	100	0	Y	Y	Y	0.07
Stockton on Tees Borough Council	3	3				N/A	N/A	N/A	N/A		<0.01
Stoke-on-Trent City Council	3	1	1	1		0	0	N/A	N		<0.01
*Stratford-on-Avon District Council 2013 data	138	225	69	20	4	0	0	Y	Y	N	5.40
Stroud District Council	172	111	1	27	33	78	100	Y	Y		1.11
Suffolk Coastal District Council	385	284	2	28	71	86	82	Y	Y	Y	0.61
Sunderland City Council	1			1		100	N/A	Y	N/A		0.01
Sutton (London Borough of)	1			1		100	N/A	Y	N/A		1.55
Swale Borough Council	15	2	5	6	2	100	100	Y	Y		0.02
Swansea City and Borough Council	101	82		7	12	100	42	Y	Y	Y	0.29

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Swindon Borough Council	10	4		3	3	100	100	Y	Y	Y	0.10
Tameside Metropolitan Borough Council	37	25		2	10	100	100	Y	Y	Y	0.08
Tandridge District Council	2	1		1		100	N/A	Y	N/A		0.05
Taunton Deane Borough Council	251	156		31	64	100	48	Y	Y	Y	0.67
Teignbridge District Council	569	376		104	89	34	0	Y	N		2.34
Telford & Wrekin Council	91	64		13	14	100	100	Y	Y		2.18
Tendring District Council	126	101	1	8	16	38	12	N	N		0.32
Test Valley Borough Council	232	133		43	56	100	100	Y	Y	Y	4.18
Tewkesbury Borough Council	105	63	6	13	23	100	81	Y	Y	Y	3.86
Three Rivers District Council	21	15		3	3	100	100	Y	N		0.04
Tonbridge and Malling Borough Council	10	4		3	3	67	67	Y	Y	Y	0.37
Torbay Council	4	1		3		100	N/A	Y	N/A		0.04
Torfaen County Borough Council	61	49		7	5	100	100	Y	Y	Y	0.19
Torridge District Council	534	390		81	63	48	8	Y	Y	Y	7.33**
Tower Hamlets (London Borough of)	3			3		100	N/A	Y	N/A		0.62

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Trafford Metropolitan Borough Council	1			1		100	N/A	N	N/A		<0.01
Tunbridge Wells Borough Council	6	3		3		100	N/A	Y	N/A		0.03
Uttlesford District Council	49	27	6	4	12	100	67	Y	Y		1.87**
Vale of Glamorgan Council	28	16		7	5	71	40	Y	N		1.75
Vale of White Horse District Council	61	35		21	5	95	100	Y	Y	Y	1.02
Wakefield Metropolitan District Council	2	1			1	N/A	100	N/A	N		<0.01
Waltham Forest (London Borough of)	1			1		0	N/A	N	N/A		<0.01
Wandsworth (London Borough of)	1			1		100	N/A	Y	N/A		4.35
Warrington Borough Council	2			2		100	N/A	Y	N/A		<0.01
Warwick District Council	33	25		3	5	100	100	N	Y		0.14
Watford Borough Council	1	1				N/A	N/A	N/A	N/A		<0.01
Waveney District Council	30	26		2	2	100	100	Y	N		0.11
Waverley Borough Council	24	14		2	8	100	100	Y	Y	Y	4.65
Wealden District Council	34	29		7	8	100	38	Y	Y	Y	0.25
Wellingborough Borough Council	3	2			1	N/A	0	N/A	N		0.02

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Welwyn Hatfield District Council	13	10		3		100	N/A	Y	N/A		0.19
West Berkshire District Council	185	104		39	42	64	12	Y	Y	Y	1.57
West Devon Borough Council	982	781		98	103	97	41	Y	Y	Y	12.48
West Dorset District Council	523	276		91	156	96	32	Y	Y		5.16
West Lancashire District Council	2	2				N/A	N/A	N/A	N/A		0.01
West Lindsey District Council	16	9		2	5	0	0	Y	N		0.19
West Oxfordshire District Council	98	25		63	10	98	100	Y	Y	Y	9.28
West Somerset District Council	956	712	1	130	113	94	70	N	N	Y	31.29
Westminster City Council	103	2		1		100	N/A	Y	N/A		1.80
Weymouth and Portland Borough Council	2				2	N/A	0	N/A	N		0.02
Wigan Metropolitan Borough Council	11	10			1	N/A	100	N/A	Y		0.01
Wiltshire Council	580	266	2	129	183	95	64	Y	Y	Y	5.52
Winchester City Council	163	92		20	51	100	100	Y	Y	Y	1.90
Windsor and Maidenhead	81	68	1	11	1	100	100	Y	Y		0.50**

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Wirral Metropolitan Borough Council	3			3		100	N/A	Y	N/A		<0.01
Wokingham Borough Council	113	93		9	11	100	55	Y	Y		0.63
Wolverhampton City Council	1			1		100	N/A	Y	N/A		<0.01
Wrexham County Borough Council	186	146	1	20	19	95	85	Y	Y	Y	0.49
Wychavon District Council	105	78		4	23	100	17	Y	Y	Y	0.85
Wycombe District Council	61	49		7	5	100	100	Y	Y		0.59
Wyre Borough Council	28	12		7	9	100	100	Y	Y		0.52
Wyre Forest District Council	25	15		2	8	100	50	Y	Y		0.37
York City Council	17	11		2	4	100	100	Y	N		0.01

Councils reporting no private water supplies

Basildon District Council	Greenwich (Royal Borough of)	Oadby and Wigston Borough Council
Bexley Borough Council	Haringey (London Borough of)	Oxford City Council
Boston Borough Council	Harrow (London Borough of)	Plymouth City Council
Bournemouth Borough Council	Hastings Borough Council	Poole Borough Council
Bracknell Forest Borough Council	Havant Borough Council	Portsmouth City Council
Brent (London Borough of)	Havering (London Borough of)	Redbridge (London Borough of)
Bristol City Council	Hounslow (London Borough of)	Richmond upon Thames (London Borough of)
Cambridge City Council	Hull City Council	Sandwell Metropolitan Borough Council
Camden (London Borough of)	Islington (London Borough of)	Sefton Metropolitan Borough Council
Cannock Chase District Council	Kingston upon Thames (Royal Borough of)	Southampton City Council
Castle Point Borough Council	Lambeth (London Borough of)	Southend-on-Sea Borough Council
Chesterfield Borough Council	Leicester City Council	Southwark (London Borough of)
Christchurch Borough Council	Lewisham (London Borough of)	St Helens Metropolitan Borough Council
Corby Borough Council	Lincoln Council	Stevenage Borough Council
Crawley Borough Council	Luton Borough Council	Surrey Heath Borough Council
Croydon (London Borough of)	Mansfield District Council	Tamworth Borough Council
Dartford Borough Council	Merton (London Borough of)	Thanet District Council
Derby City Council	Middlesbrough Borough Council	Thurrock Council
Ealing (London Borough of)	Newcastle-upon-Tyne City Council	Walsall Metropolitan Borough Council
Eastbourne Borough Council	Newham (London Borough of)	Woking Borough Council
Fenland District Council	Northampton Borough Council	Worcester City Council
Gloucester City Council	North Tyneside Metropolitan Borough Council	Worthing Borough Council
Gosport Borough Council	Nuneaton & Bedworth Borough Council	

Annex 2: Summary of test results for 2014 (England and Wales)

Parameter	Standard	Number of samples	Number of failures	Percentage of failures in 2014	Percentage of failures in 2013
Escherichia coli	0/100 ml	13,828	1,769	12.8	10.9
Enterococci	0/100 ml	7,829	1,053	13.4	11.1
Colony counts after 48 hours at 37°C	No abnormal change	9,156	-	-	-
Colony counts after 3 days at 22°C	No abnormal change	9,087	-	-	-
Coliform bacteria (Indicator)	0/100 ml	12,885	2,858	22.2	22.4
Clostridium perfringens	0/100 ml	6,004	524	8.7	9.0
Pseudomonas aeruginosa	0/250ml	191	6	3.1	4.4
1 2-Dichloroethane	3.0µg/l	448	0	0	0.3
Aluminium	200µg/l	5,560	146	2.6	2.4
Ammonium	0.5mg/l	6,628	146	2.2	1.4
Antimony	5.0µg/l	955	0	0	0.3
Arsenic	10µg/l	1,804	58	3.2	4.9
Benzene	1.0µg/l	505	0	0	-
Benzo(a)pyrene	0.01µg/l	374	1	0.3	2.0
Boron	1.0µg/l	848	3	0.4	3.8
Bromate	10µg/l	641	6	0.9	0.8
Cadmium	5.0µg/l	1,225	3	0.2	0.2
Chloride	250mg/l	803	11	1.4	1.9
Chromium	50µg/l	1,205	1	0.1	-
Colour	20mg/l Pt/Co	6,514	103	1.6	1.2
Conductivity	2500 µS/cm at 20°C	8,964	10	0.1	0.1
Copper	2.0mg/l	2,743	44	1.6	4.2
Cyanide	50µg/l	484	1	0.2	0.3
Fluoride	1.5mg/l	1,260	36	2.9	2.9
Hydrogen ion (pH) (Indicator)	6.5 – 9.5	9,711	1,336	13.8	13.8
Iron	200µg/l	7,105	536	7.5	7.9
Lead	10µg/l	3,484	379	10.9	2.5
Manganese	50µg/l	6,959	603	8.7	10.2
Mercury	1.0µg/l	519	0	0	0.2
Nickel	20µg/l	1,429	31	2.2	4.3
Nitrate	50µg/l	6,281	635	10.1	11.7
Nitrite – consumers' taps	0.5µg/l	4,055	22	0.5	0.7
Nitrite – treatment works	0.1µg/l	1,419	32	2.3	8.0
Odour	No abnormal change	4,882	287	5.9	22.9
Polycyclic Aromatic Hydrocarbons	0.1µg/l	240	3	1.3	4.2
Selenium	10µg/l	863	2	0.2	0.4
Sodium	200mg/l	1,154	37	3.2	4.4
Sulphate	250mg/l	903	29	3.2	2.2
Taste	No abnormal change	3,927	164	4.2	21.0
Tetrachloromethane	3.0µg/l	425	0	0	-
Total indicative dose	0.1mS/year	23	0	0	5.3
Total Organic Carbon	No abnormal change	284	0	0	-
Trichloroethene and Tetrachloroethene	10µg/l	374	6	3.1	1.0
Trihalomethanes	100µg/l	308	2	0.6	-
Tritium	100 Bq/l	90	0	0	-
Turbidity at tap	4NTU	8,510	221	2.6	2.8
Turbidity at works	1NTU	1,244	113	9.1	10.7

Annex 2: continued

Parameter	Standard	Number of samples	Number of failures	Percentage of failures in 2014	Percentage of failures in 2013
Pesticides					
Aldrin	0.03µg/l	389	1	0.3	-
Dieldrin	0.03µg/l	395	0	0	-
Heptachlor	0.03µg/l	388	0	0	-
Heptachlor Epoxide	0.03µg/l	361	1	0.3	-
Other pesticides*	0.1µg/l	12,702	68	0.5	0.3
Total pesticides	0.5µg/l	334	2	0.6	0.5
Total		181,296	11,574	6.4	7.2

The data set reported this year had a small number (588) samples removed where they were taken at an inappropriate location, for example, the source and there was evidence that a sample had been taken on the same day from the correct location (for example, kitchen tap), or the supply was not being used or had not been commissioned.

Annex 2.1: Pesticide detections – England and Wales 2014

Pesticide (* indicates registered for use in the UK)	Number of samples	Number of failures	Percentage of failures
*Prothioconazole	4	1	25.0
Desethylatrazine	44	10	22.7
Mecarbam	5	1	20.0
Trichlorobenzene	13	2	15.4
1,1,1-trichloro-2,2-ethane pp'-DDT"	140	8	5.7
DichlorodiphenyldichlorethanePp'-DDD TDE	46	2	4.3
*Mecoprop-P	23	1	4.3
Parathion (Parathion ethyl)	24	1	4.2
1,1-dichloro-2,2-bis-ethane pp'-DDE"	52	2	3.8
Hexachlorobutadiene	84	2	2.4
Carbophenothion	53	1	1.9
*Glyphosate	54	1	1.9
Trichloro-2(2chlorophenyl)2eth op'-DDT	54	1	1.9
Diuron	277	5	1.8
Hexachlorobenzene	115	2	1.7
Monuron	61	1	1.6
*Dimethoate	72	1	1.4
Terbutryn	223	3	1.3
Malathion	75	1	1.3
Prometryne	152	2	1.3
Propazine	156	2	1.3
Atrazine	318	4	1.3
Trietazine	160	2	1.3
*Bentazone	222	2	0.9
*Metaldehyde	113	1	0.9
Diazinon	123	1	0.8
Simazine	311	2	0.6
*Carbetamide	184	1	0.5
*Dichlorprop	213	1	0.5
*Chlortoluron	269	1	0.4
*Isoproturon	274	1	0.4
*Linuron	277	1	0.4
*MCPP(Mecoprop)	277	1	0.4

Annex 3: Guidance and technical advice

The following guidance, technical advice notes and information letters with application to private water supplies have been published by the Drinking Water Inspectorate on the website http://www.dwi.defra.gov.uk

Date issued	Title
October 2014	Protection of drinking water sources: Roles, responsibilities and pollution prevention advice
October 2014	Risk assessments
November 2013	New European requirements for monitoring for radioactivity in drinking water supplies.
November 2013	Drinking water analysis and the regulatory requirements.
September 2013	Collection of data under the Private Water Supplies Regulations 2009 and the Private Water Supplies (Wales) Regulations 2010.
June 2013	Technical advice note: Regulation 17 – Authorisation of different standards.
May 2013	Potential contaminants in drinking water treatment chemicals.
April 2013	DWI technical advice note on Regulation 8.
April 2013	Viruses in raw and partially treated water: targeted monitoring using latest methods.
2013	Health-based targets for drinking water safety and regulation.
2013	Probabilistic modelling for assessment of exposure via drinking water.
October 2012	Collection of data under the Private Water Supplies Regulations 2009 and the Private Water Supplies (Wales) Regulations 2010.
April 2012	Legislation of private water supplies and drought.
February 2012	Publication of research report on human pharmaceuticals in raw and treated river water to inform regulatory risk assessment methodology.

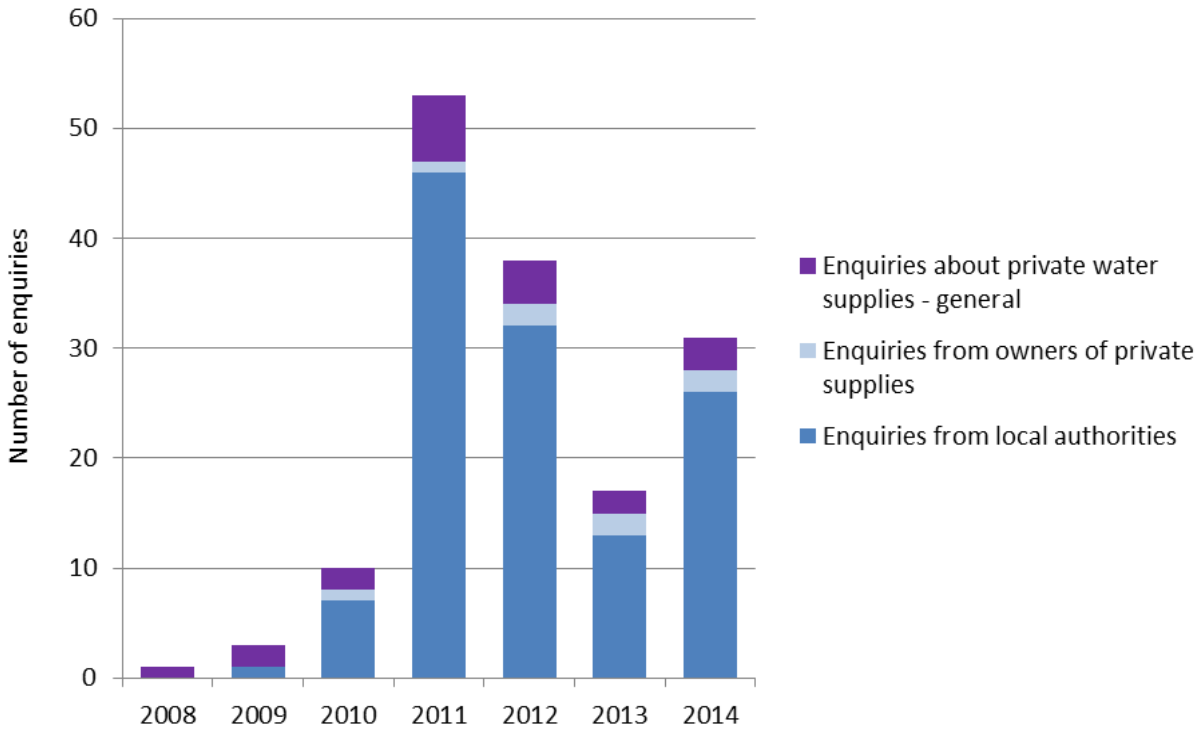
Date issued	Title
February 2012	Arrangements for demonstrating that the laboratory analysis of samples of drinking water and the associated reporting of analytical results meet regulatory requirements.
December 2011	BS 8551:2011 – Provision and management of temporary water supplies and distribution networks (not including provisions for statutory emergencies). Code of practice.
December 2011	Provision of alternative supplies in emergency and non-emergency situations.
November 2011	Guidance to local authorities in England on charging arrangements under the Private Water Supplies Regulations 2009.
October 2011	Information Letter 09/2011 Collection of data under the Private Water Supplies Regulations 2009 and the Private Water Supplies (Wales) Regulations 2010.
October 2011	Private distribution systems.
September 2011	Chlorine residual testing.
July 2011	Roles and responsibilities of HPA, local authorities and DWI.
March 2011	Milking parlours served by a small private supply.
March 2011	Nitrate and private water supplies.
January 2011	Regulation 5(1)1 – Use of products or substances in private water supplies.
October 2010	Legislative background to the Private Water Supplies Regulations 2009.
October 2010	Guidance on using contractors to deliver Local Authority duties under the Private Water Supplies
October 2010	Guidance to local authorities in England on charging arrangements under the Private Water Supplies Regulation 2009.
April 2010	Collection of data under the Private Water Supplies Regulations 2009.
February 2010	The use of ultraviolet (UV) irradiation (written for public supplies, but the advice can be applied to private water supplies).

Annex 4: Enquiries about private water supplies handled by the Drinking Water Inspectorate

Numbers of enquiries received 2008–2014 for Wales

	2008	2009	2010	2011	2012	2013	2014
Enquiries from local authorities	0	1	7	46	32	13	26
Enquiries from owners of private supplies	0	0	1	1	2	2	2
Enquiries about private water supplies – general	1	2	2	6	4	2	3
Total	**1**	**3**	**10**	**53**	**38**	**17**	**31**

Number of enquiries received from 2008–2014 indicating the origin of the enquiry – Wales



Annex 5: Glossary and description of standards

Aluminium occurs naturally in some source waters. It is removed from drinking water by conventional water treatment (coagulation and filtration). The standard is 200µg Al/l.

Ammonium salts are naturally present in trace amounts in most waters. Their presence might indicate contamination of sanitary significance and they interfere with the operation of the disinfection process. The guide value is 0.5mg NH_4/l.

Antimony is rarely found in drinking water. Trace amounts can be derived from brass tap fittings and solders. The standard is 5µg Sb/l.

Arsenic occurs naturally in only a few sources of groundwater. Specific water treatment is required to remove it. The standard is 10µg As/l.

Benzene is present in petrol. It is not found in drinking water, but it can migrate through underground plastic water pipes if petrol is spilt in the vicinity. Some bottled waters and soft drinks which include sodium benzoate as an ingredient have been reported as containing benzene. The standard is 1µg/l.

Benzo(a)pyrene is one of several compounds known as polycyclic aromatic hydrocarbons (PAHs). Their source in drinking water is as a result of the deterioration of coal tar which was used to line water pipes up until the early 1970s. The standard is 0.01µg/l.

Boron in surface water sources comes from industrial discharges or from detergents in treated sewage effluents. It can be present in partially desalinated seawater when this is used to supplement drinking water supplies. Concentrations found in drinking waters are generally very low. The standard is 1mg B/l.

Bromate can be formed during disinfection of drinking water as a result of a reaction between naturally occurring bromide and strong oxidants (usually ozone). It may be generated in the manufacture of sodium hypochlorite disinfectant. It can also arise from using an inappropriate grade of sodium hypochlorite for water treatment. Exceptionally, groundwater beneath an industrial site can become contaminated with bromate. The standard is 10µg BrO_3/l.

Cadmium is rarely detected in drinking water and trace amounts are usually due to the dissolution of impurities from plumbing fittings. The standard is 5µg Cd/l.

Chloride is a component of common salt. It may occur in water naturally, but it may also be present due to local use of de-icing salt or saline intrusion. The guide value is 250mg Cl/l.

Clostridium perfringens is a spore-forming bacterium that is present in the gut of warm-blooded animals. The spores can survive disinfection. The presence of spores in drinking water in the absence of *E.coli* and Enterococci indicates historic or remote faecal contamination that requires investigation. The standard is 0 per 100ml.

Chromium in drinking water comes from the coatings on some taps and plumbing fittings. The standard is 50µg Cr/l.

Coliform bacteria are widely distributed in the environment often as a result of human or animal activity, but some grow on plant matter. Their presence in a water supply indicates a need to investigate the integrity of the water supply system. The standard is 0 per 100ml.

Colony counts are general techniques for detecting a wide range of bacteria, the types and numbers being dependent on the conditions of the test. These counts, if done regularly, can help to inform water management, but they have no direct health significance. The standard is 'no abnormal change'.

Colour occurs naturally in upland water sources and is caused by natural organics which are characteristic of these catchments. Colour can be the cause of elevated disinfection by-products where chlorine is used for disinfection. The standard is 20mg/l on the Pt/Co scale.

Conductivity is a non-specific measure of the amount of natural dissolved inorganic substances in source waters. The guide value is 2,500µS/cm.

Copper in drinking water comes mostly from copper pipes and fittings in households. In general, water sources are not aggressive towards copper, but problems very occasionally occur in new installations. These 'blue water' events can be avoided by good plumbing practices. The standard is 2mg Cu/l.

Cyanide is not normally present in drinking water, but could be present in surface water as a result of a specific industrial contamination incident. The standard is 50µg CN/l.

1,2-Dicholoroethane is a solvent that may be found in groundwater in the vicinity of industrial sites. Where necessary it can be removed by special water treatment. The standard is 3µg/l.

Escherichia coli (E.coli) **and Enterococci** are bacteria present in the gut of warm-blooded animals. They should not be present in drinking water and, if found, immediate action is required to identify and remove any source of faecal contamination that is found. The standard is 0 per 100ml.

Fluoride occurs naturally in many water sources, especially groundwater. It cannot be removed by conventional water treatment, so high levels must be reduced by blending with another low fluoride water source. The standard is 1.5mg F/l.

Hydrogen ion (pH) gives an indication of the degree of acidity of the water. A pH of 7 is neutral; values below 7 are acidic and values above 7 are alkaline. A low pH water may result in pipe corrosion. This is corrected by adding an alkali during water treatment. The guide value is a range between 6.5 and 9.5.

Iron is present naturally in many water sources. However, the most common source of iron in drinking water is corrosion of iron water mains. The standard is 200µg Fe/l.

Lead very occasionally occurs naturally in raw waters, but the usual reason for its presence in drinking water is lead plumbing in older properties. The permanent remedy is for householders to remove lead pipes and fittings. The standard is currently 25µg Pb/l. A stricter standard of 10µg Pb/l will apply from 2013 onwards.

Mercury is not normally found in sources of drinking water in the UK. The standard is 1µg Hg/l.

Nickel occurs naturally in some groundwater and, where necessary, special treatment can be installed to remove it. Another source of nickel in drinking water is the coatings on modern taps and other plumbing fittings. The standard is 20µg Ni/l.

Nitrate occurs naturally in all source waters although higher concentrations tend to occur where fertilisers are used on the land. Nitrate can be removed by ion exchange water treatment or through blending with other low nitrate sources. The standard is 50mg NO_3/l.

Nitrite may occur where ammonia is present in the source and chlorine is used for disinfection. Careful operation of the disinfection process ensures that levels of nitrite are below the standards of 0.1mg NO_2/l in water leaving water treatment works and 0.5mg NO_2/l at consumers' taps.

Odour and taste can arise as a consequence of natural substances in surface waters, particularly between late spring through to early autumn. The standard is described as acceptable to consumers and no abnormal change in odour or taste.

Pesticides – organochlorine compounds (aldrin, dieldrin, heptachlor, heptachlor epoxide) are no longer used in the UK because they are persistent in the environment. They are very unlikely to be found in drinking water. The standard for each compound is 0.03µg/l.

Pesticides – other than organochlorine compounds are a diverse and large group of organic compounds used as weed killers, insecticides and fungicides. Many water sources contain traces of one or more pesticides as a result of both agricultural uses mainly on crops and non-agricultural uses, mainly for weed control on highways and in gardens. The standard is 0.1µg/l for each individual substance and 0.5µg/l for the total of all pesticides.

Polycyclic aromatic hydrocarbons is a group name for several substances present in petroleum-based products such as coal tar. The standard is 0.1µg/l for the sum of all the substances (see Benzo(a)pyrene listed above for more information).

Selenium is an essential element and a necessary dietary component. Amounts in drinking water are usually well below the standard of 10µg Se/l.

Sodium is a component of common salt (sodium chloride). It is present in seawater and brackish groundwater. Some water treatment chemicals contain sodium. Concentrations in drinking water are extremely low, but some water softeners can add significant amounts where they are installed in homes or factories. The standard is 200mg Na/l.

Sulphate occurs naturally in all waters and cannot be removed by treatment. The guide value is 250mg SO_4/l.

Tetrachloroethane and Trichloroethene are solvents that may occur in groundwater in the vicinity of industrial sites. Where necessary they are removed by specialist treatment. The standard is 10µg/l for the sum of both substances.

Trihalomethanes are formed during disinfection of water by a reaction between chlorine and naturally occurring organic substances. Their production is minimised by good operational practice. The standard is 100µg/l.

Vinyl chloride may be present in plastic pipes as a residual of the manufacturing process of polyvinyl chloride (PVC) water pipes. Its presence in drinking water is controlled by product specification. The standard is 0.5µg/l.

Tetrachloromethane is a solvent that may occur in groundwater in the vicinity of industrial sites. Where necessary it is removed by specialist water treatment. The standard is 3µg/l.

Total Indicative Dose is a measure of the effective dose of radiation the body will receive from consumption of the water. It is calculated only when screening values for gross alpha or gross beta (radiation) are exceeded. The guide value is 0.10mSv/year.

Total Organic Carbon represents the total amount of organic matter present in water. The guide value is ‘no abnormal change’.

Tritium is a radioactive isotope of hydrogen. Discharges to the environment are strictly controlled and there is a national programme of monitoring surface waters. The guide value for drinking water sources is 100Bq/l.

Turbidity measurement is an important non-specific water quality control parameter at water treatment works because it can be monitored continuously on line and alarms set to alert operators to deterioration in raw water quality or the need to optimise water treatment. The standard at treatment works is 1NTU. Turbidity can also arise at consumers’ taps following disturbance of sediment within water mains; the standard at consumers’ taps is 4NTU.

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