IN THE COVENTRY MAGISTRATES COURT

CHIEF INSPECTOR OF DRINKING WATER

(acting for and on behalf of the Secretary of State
for Environment, Food and Rural Affairs)

-v-

SEVERN TRENT WATER LIMITED

OPENING NOTE

The Defendant

1. Severn Trent Water is one of the largest of the 10 regulated water and sewerage companies in England and Wales, supplying on average more than 1.8 billion litres of drinking water each day to 7.7 million people right across the Midlands and into Wales. According to the 2013 Annual Report, the company's Annual Turnover is £1,511 million and its Gross Profit, as for last year, approximately £500 million.

The Offences

2. So far as is relevant **section 70** states:

> (1) Subject to subsection (3) below, where a water undertaker's supply system is used for the purpose of supplying water to any premises and that water is unfit for human consumption the relevant persons shall be guilty of an offence and liable-
>
> (a) on summary conviction, to a fine not exceeding £20,000
>
> (b) on conviction on indictment, to a fine.
>
> (1A) For the purposes of subsection (1) above, the relevant persons are-

(a) the water undertaker whose supply system is used for the purposes of supplying the water (in this section referred to as the "primary water undertaker") and

...

(3) In any proceedings against any relevant person for an offence under this section it shall be a defence for that person to show that it-

(a) had no reasonable grounds for suspecting that the water would be used for human consumption; or

(b) took all reasonable steps and exercised all due diligence for securing that the water was fit for human consumption on leaving the primary water undertaker's pipes or was not used for human consumption.

3. There is no statutory definition of *water unfit for human consumption*. However, water is generally recognised as unfit if either:

1. The water if drunk would be likely to, or when drunk did in fact, cause injury to the consumer, or

2. The water, by reason of its appearance and/or smell, was of such a quality that it would cause a reasonable consumer of firm character to refuse to drink it or use it in the preparation of food.

4. It is important to note that a company may avail itself, in appropriate circumstances, of the statutory defence. Where a company pleads guilty to offences under section 70, it is admitting not only that it supplied water that was unfit for human consumption, but also that it did not take all reasonable steps and exercise all due diligence to secure that the water was fit for human consumption on leaving its pipes or was not used for human consumption.

Drinking Water Inspectorate

5. This prosecution is brought on behalf of the Chief Inspector of Drinking Water, [redacted]. She is head of the Drinking Water Inspectorate (DWI), and exercises the powers and duties of the Secretary of State for Environment, Food and Rural Affairs in relation to drinking water quality issues.

6. DWI was formed in 1990 to provide independent reassurance that water supplies in England and Wales are safe and drinking water quality is acceptable to consumers. Its main aim is to help protect public health and maintain public confidence in drinking water through independent, effective and proportionate regulation of the quality of drinking water supplies, and by providing independent technical advice on all aspects of drinking water quality.

7. DWI carry out technical audits of every water company in England and Wales and assess water quality based on information provided by the water companies. This information includes the results of millions of tests made each year by water companies, seeking to ensure that water meets regulatory standards. DWI also carry out inspections to be sure that the results provided by the companies are reliable and give a true picture of the quality of water they are supplying.

8. The Water Industry (Suppliers' Information) Direction 2012 requires all water companies to inform DWI of all events that have affected, or are likely to affect, drinking water quality, or sufficiency of supplies and, where as a result, there may be a risk to consumers' health.

9. DWI assess the information provided by the company, and in certain cases will ask for more, and/or launch its own investigation.

10. DWI was notified of such an event by Severn Trent Water Limited on 23 November 2012, when precautionary Boil Water advice had to be issued to over 2,000 properties in Broadway, Worcestershire, after faecal contamination, evidenced by *E coli*, was detected in samples collected from the treated water at Broadway service reservoir and from several consumers' taps. *Cryptosporidium bovis*, a parasite found in the gut of cows, was subsequently detected in samples collected from the reservoir, [redacted]
The Boil Water advice was only lifted on 3 December 2012 after the company had taken steps to remedy the situation and samples showed the supply was free from contamination.

11. In summary, DWI received the usual statutory reports from the company, which included details of the site and its history, details of the event and how it unfolded, details of customer contacts, the results of the many samples that were analysed and the results of the company's own investigations. As well as considering this material, DWI interviewed and took witness statements from members of staff at Severn Trent, and from some affected consumers and interviewed a member of the Board at Severn Trent under caution. It also inspected the Broadway site shortly after the event was concluded.and served Enforcement action against the company requiring it to carry out enhanced monitoring at the site, to identify all underground assets at the site of the service reservoir and to identify and eliminate the source of the contamination. I will return to the event, providing more detail, after a short summary of the legislative framework governing the water industry.

The Regulatory Background

12. Water companies have a legal duty to safeguard the quality of public water supplies and to ensure that water supplied for cooking, drinking, food preparation or washing purposes is wholesome. Wholesomeness is now defined by standards for a wide range of substances, organisms and properties of water. The standards are set to be protective of

public health and the definition of wholesome reflects the importance of ensuring that water quality is acceptable to consumers. The legal standards in the UK are those which are set in Europe in the Drinking Water Directive 1998 together with National Standards set to maintain the high quality of water already achieved. The standards are strict and include wide safety margins. They cover:

- micro-organisms such as *E. coli*
- chemicals such as nitrate and pesticides
- metals such as iron, aluminium and manganese, and
- the way water looks, smells and how it tastes.

13. There should be no *E coli*, either in samples taken from consumers' taps or from water treatment works or service reservoirs. Detection of *E. coli* indicates faecal contamination of the water.

14. It has been known since 1990 at least, that cryptosporidiosis, an unpleasant diarrhoeal disease, can be spread by contaminated drinking water. The implications for public health are, of course, obvious. The disease is caused by infection by *cryptosporidium*, a protozoan parasite that infects a wide range of animals, including humans.

15. The parasite originates from the faeces of infected animals, including humans, and is transmitted through the environment in the form of oocysts, which have a tough outer shell protecting them from the environment, and enabling them to survive for a long time.

16. Young children are more commonly affected by cryptosporidiosis, but anyone can become infected. Most healthy people will recover within 4 – 6 weeks. However, those with a compromised immune system or with other medical conditions may be more seriously affected and cryptosporidiosis can be fatal for those receiving chemotherapy or for AIDS patients, since there is as yet no effective treatment for it.

17. Following a large outbreak of cryptosporidiosis in Swindon and Oxfordshire in 1989, the Government established an Expert Group on *Cryptosporidium* in Water Supplies whose Terms of Reference were to examine the occurrence and extent of *cryptosporidium* in water supplies and assess the significance for public health. The Group was also tasked to formulate advice to water companies on monitoring strategies and the protection of water supplies, treatment processes and the maintenance of distribution systems.

18. *Cryptosporidium* poses a challenge to water treatment processes in particular because of its small size and its resistance to chlorine. However, most investigations of outbreaks have shown that they happen only when some aspect of water treatment is inadequate. There is good evidence that careful design and operation of water treatment affords a very high level of protection against exposure to the parasite.

19. The Expert Group considered detailed scientific and other evidence, and reports on waterborne outbreaks of cryptosporidiosis in various locations in the UK and the USA, and concluded that, as well as infection through contact with the faeces of an infected animal, contaminated drinking water must be regarded as a cause of primary cases of cryptosporidiosis in the community. It initiated a national programme of research intended to ensure more effective control of *cryptosporidium* in water supplies, and outlined a code of best practice to be followed by water companies and other authorities to minimise the risk of an outbreak of cryptosporidiosis.

20. One of the cases considered by the Expert Group occurred in Ayrshire in April 1988. This was the first outbreak of cryptosporidiosis in the UK in which cryptosporidial oocysts had been detected in treated water. Oocysts had apparently been introduced into the break-pressure tank, via an old fire-clay pipe which was collecting run-off from the

surrounding catchment area. The catchment had recently been sprayed with cattle slurry and dung. The fire-clay pipe was shown in the site records as disconnected. It was in fact connected.

21. It was acknowledged in the Report that leakage in of oocysts to a service reservoir posed a particular threat to those consumers supplied from it, as there is no further barrier to oocysts reaching their taps. The Badenoch Report endorsed the Guidelines already in existence recommending that water companies should ensure that livestock should not be allowed to graze on grass-covered service reservoirs.

22. Severn Trent was one of several water companies actively involved in the research undertaken by and on behalf of the Expert Group. Like all other water companies, they received from DWI after the Final Report was published further guidance in the form of an Information Letter. This Letter reminded water companies that they should be implementing the recommendations of the Badenoch Report, which had all been accepted and endorsed by government. In particular companies were required to ensure that they took action to prevent grazing of grass-covered service reservoirs by livestock. Severn Trent responded to the Information Letter in terms that it was fully committed to taking all practicable steps to minimise cryptosporidial breakthrough, and would be adopting a three pronged approach involving catchment protection/monitoring, optimising treatment processes and refining response procedures in the event of actual or potential contamination. Their response went on to say that their policy for some years had been to prevent livestock from grazing on service reservoirs by fencing or other means. In addition, they had been carrying out a routine programme of internal and external inspection and repair to prevent contaminated water ingress, supplemented by an enhanced service reservoir monitoring programme designed to provide early indication of faecal contamination.

23. In due course, Drinking Water Quality Regulations were introduced requiring water companies to carry out risk assessments for *cryptosporidium*, and where it was identified as a risk, to improve treatment and monitor for the parasite on a continuous basis. From the beginning of 2008, the Regulations have been expanded and tightened, and water companies are now required to carry out risk assessments of water supplied from a treatment works or supply system which may constitute a potential risk to human health. These new Regulations make raw water monitoring a regulatory requirement, and impose a duty on water companies to carry out comprehensive, multi-hazard, risk assessments for each treatment works and associated supply system.

24. Water Safety Plans require identification and documentation of all actual and potential hazards arising anywhere in the water supply system between the catchment and consumers' taps, followed by implementation of short, medium and long term measures to mitigate the risks. Each water company has a duty to keep each risk assessment under continual review and provide an updated report to DWI whenever there is any material change, either to risk or to risk mitigation.

The Charges

25. The charges are set out at pages 1 and 2 of the bundle. There are 11 in total. Each charge concerns the provision of water unfit for human consumption to particular premises in the village of Broadway. The eleven consumers who have made statements were identified from responses to a DWI questionnaire, but I don't think anyone involved would seek to suggest that only those 11 premises received water of the same or similar quality as is described by the 11 residents whose premises are identified in the charges.

26. From just before 6 pm on the evening of Wednesday 21 November 2012, Severn Trent was being contacted by customers living in Broadway, who reported the supply of discoloured water, in some cases with an unusual taste and odour, such as petrol. By 8 pm twelve calls had been received, and the last call in the early hours brought the evening's total up to 23. Calls continued throughout the following days. In all the company received 73 calls about the appearance, taste or odour of the water, and a further 435 contacts were recorded on the call messaging system used to intercept calls between 23 and 25 November. As there are only about 2,000 properties in the affected area, this suggests that in the region of a quarter of the population contacted the company during the event.

27. One of the earliest callers was [redacted] Company records show that his call was made on Wednesday evening at 7.34pm and was the ninth call that evening. [redacted] says in his statement that he was alerted to the condition of the tap water at about 5 pm, when his kids complained to him about it. He checked and saw the water was cloudy brown, although he could discern no grit or sediment in it. He described the taste as metallic. [redacted] was advised to run the taps for 20 minutes and then repeat the process. He ran the tap for about an hour, but says it made no difference. Even though he had been advised by the company that the water was OK to drink, he wasn't prepared to drink any, and didn't. He

suspected there had been some kind of incident that was affecting more than just his property because when he went to the supermarket that evening to buy bottled water, stocks were running low, so he checked the company's website himself. [redacted] didn't use the water except for washing.

28. Less than half an hour after [redacted] telephoned Severn Trent. She had noticed, at some time between 6 and 8 pm that the water, although it was clear and had no noticeable smell, had an odd taste, which she could only describe as a mix between chemical and petrol. As soon as she tasted it, she knew it wasn't right and wasn't prepared to drink it. [redacted] was concerned as she had just given her baby a beaker of the water. She called the company to report the quality of the water, and told them [redacted] had drunk some of it [redacted] was advised to boil the water before drinking it. At 10 the next morning a sampler arrived at her house and agreed the water had an odd taste. Over the next few days, more samples were taken from [redacted], but despite enquiring [redacted] was never informed of any test results. [redacted] herself was unwell during this period and consulted her GP. He tested her for stomach ulcers but told her she had gastroenteritis. [redacted] still doesn't know if the illness was related to the water or not. To avoid using the water, she took [redacted] to her [redacted] for baths. [redacted] felt that the advice she was given by Severn Trent was conflicting. There didn't seem to be a company line, it seemed to depend upon who you asked. The sample taken from [redacted] on 22 November was not tested for bacteriological failures, but analysis showed elevated turbidity, and separate laboratory tests for odour and taste detected chemical. By the time she made her witness statement, in March 2013, [redacted] was still not drinking the tap water, preferring instead to use bottled water.

29. [redacted] had first noticed a problem with the water when she ran a bath at about 7 pm that Wednesday evening.

The water was yellowy/brown in colour and had a metallic odour. She said the water tasted funny, even when boiled. She called the company shortly after 9 pm to report this. This was the 16th call received at Severn Trent that evening. [redacted] knew that some of her neighbours were similarly affected, and explained that she was concerned as her daughter had drunk some of the water earlier that evening. She specifically asked the operator if the water was safe, and, contrary to what [redacted] had been told an hour earlier, was told the water was "100% perfectly safe". [redacted] was told that the problem was caused by disturbed natural sediment. She was advised to run the tap at ½ flow for 20 minutes to clear the discolouration, and if this didn't work, after 20 minutes' wait, to try it again. [redacted] followed this advice, but says it made no difference. She learned from FaceBook later that evening that others in the village had experienced problems with discolouration[redacted] called the company again on the next day to request bottled water because her supply was still discoloured and 4 bottles were delivered at 10 pm that night. At that time, Severn Trent were still saying the water was safe to drink.

30. Whilst [redacted] may have been the 16th call, so that the company must have been aware the problems were not isolated, they had not commenced any investigations by this time. There was therefore no evidence available about the safety or otherwise of the water.

31. The DWI published advice on its web-site in 2010 which states:

> "If your tap water is suddenly discoloured you should not assume that it is safe to drink until you have sought advice from your water company."

The import of this advice applies as much, if not more, to water companies, who ought not to assume, and advise their consumers, that such water is safe. Until a company has identified the cause and extent

of the problem, they are simply not in a position to give advice to this effect.

32. [redacted], also called Severn Trent that Wednesday evening. This was at about 9.15 pm., [redacted] had noticed that his water was brown, and when he tried to filter it through a jug, to see if it cleared, the water remained cloudy[redacted] neighbour's water supply was the same. The operator told [redacted] there had been quite a few calls from the Broadway area, with reports of discoloured and aerated water. The operator confessed that the company was not too sure what was going on, but had sent an engineer out to investigate. [redacted] said that he was not concerned about aerated water, but thought brown was not normal. The operator explained that the brown discolouration was natural sediment and minerals that had built up over time in the pipes, and then been disturbed for some reason, such as a burst. He went on to say that although the water did not look very nice, the natural sources, like earth, rocks and sand that formed the sediment were perfectly harmless. [redacted] questioned this – as he pointed out, not all natural sources are necessarily harmless, but the operator insisted there had never been any issues with samples of the sediment in pipes. When asked if he could just ignore the appearance of the water and carry on as normal, the operator said he could use the water as he normally would. [redacted] however decided that he wouldn't drink the water and used bottled water instead. In order to try and keep up to date with developments, [redacted] signed up to Twitter. Conscious they might not be in a position to do the same, he printed off pages from the web for his [redacted] neighbours.

33. The company had not been able immediately to identify the cause of the problem. There was no planned work or reported bursts, for example, that might account for sediment in the mains being disturbed.

34. On the basis that some event must have disrupted flows in the mains, disturbing sediment and thus causing discolouration, a [redacted] was sent to the area to investigate.

35. However, as he only arrived in the area close to midnight, instead of knocking on customers' doors so late at night to take samples from their taps, he was instructed to take samples from 2 hydrants in the area. Of course, it was dark but even so by holding the samples against his white van and shining a light through them, he was able to discern what he described as a brown tint in the water. He thought the taste and odour were fine. He did not have the necessary equipment with him to test the turbidity, that is, the cloudiness, of the water, and did not take any samples for bacterial analysis. It was decided that these samples, together with what consumers were telling them, indicated nothing significant, and the company decided to leave the system to see if it settled overnight. Arrangements were put in place for further samples to be taken next morning.

36. However, calls to the company started again at 7.20 next morning. Before 8am calls had been received from consumers in [redacted], as well as from another house in [redacted] The strategy of leaving the system to settle overnight had clearly not been an effective one.

37. [redacted]. She had noticed, when she was bathing her 6 month old daughter, [redacted], at 6 pm on Wednesday night that the water from the tap was cloudy. When a few hours later, she made herself a cup of tea, it tasted and smelled of plastic or minerals. [redacted] contacted Severn Trent shortly after 8 am on Thursday morning as the taste of the water had not improved overnight. She was asked if the company could send someone to collect a sample from her home, and an appointment was duly made for a sampler to call the next morning, but in fact no one ever arrived. [redacted] later discovered the sampler had gone to her

neighbour's house. [redacted] told the operator that she was going to the supermarket to buy bottled water to use for her daughter's formula milk. She was concerned about using the tap water, as her daughter had recently had major bowel surgery and she wasn't prepared to use that for feeds. [redacted] also took [redacted] in the next village for baths. The company did provide bottled water but only from late on the following Saturday. [redacted] kept up to date with what was happening by following the company's web-site. They say they were happy to use the tap water again after the incident was fully resolved, although they waited a bit longer to use it for [redacted] baths. The sample that was taken from [redacted] on 22 November was found on analysis to be contaminated with coliforms and *E coli.*

38. In fact [redacted] had contacted the company about half an hour after [redacted].

39. [redacted] had first noticed a problem with her water on Thursday morning, when she noticed the water in the toilet and sink looked yellowy/brown in colour, as did some tap water she put into a glass. When she looked later, the water in the glass was still discoloured so she contacted Severn Trent. This was at 9.45 am. [redacted] was concerned to know if the water was safe to drink; as she explained to the operator, her young children had taken bottles of squash made with tap water with them to school. She was told that the water was definitely safe to drink. The operator said there had been a number of calls from the area, but the company did not at that stage know the reason for the discolouration. He explained that discolouration was normally caused when sediment in the pipes was disturbed. He also advised [redacted] to run the tap for 20 minutes during which time the water should run clearer, but if that didn't work, to wait an hour and try it again. Later [redacted] received a call back from Severn Trent advising her not to drink the water without boiling it first – she asked if there was any risk to her children and was told to

consult her GP if she had any concerns. [redacted] immediately [redacted] and then went out and bought bottled water. [redacted]

40. [redacted]. He noticed a problem first thing on Thursday 22 November - his water was yellow. He called Severn Trent, but had some trouble getting through. The company's records show that he contacted them at 10.30 am. The operator told him that the company was experiencing some problems in the area, and said that the yellow colour indicated that a natural sediment had been disturbed and churned up by changes in flow. She said that the company had received similar calls the day before and had gangs in the area flushing the mains to remove the discolouration. [redacted] specifically asked if there was any health issue with the water. He was reassured there was not – and was told the water was safe. Despite this advice, he didn't use the water except to clean his teeth and for washing. He had bottled water in the house and also used a jug filter. Severn Trent took several samples from [redacted] including a volume sample through the garden tap which took about 30 minutes, but [redacted] has never been provided with test results. He, however, had no complaints about the company's reactions to the event, although he was still waiting in March 2013, when he made his witness statement, for the company to come and fix the kitchen tap, which had been broken during the sampling process[redacted] says he was reassured by the company's response to the event which he described as excellent and he retains confidence in the water supply.

41. [redacted] called Severn Trent at about 11 am on Thursday morning. During the previous evening she had drunk quickly from a pint glass of water before noticing that the water tasted horrible and muddy and was chalky-looking. That morning the water for her bath was brown with a slight odour. She explained

that the water was brown and tasted funny, [redacted] was told that it was just a build-up of calcium, and that the water was safe to drink. However, [redacted] decided she would not use it and bought bottled water to use instead that day. [redacted] says she felt really rubbish and had a really bad stomach on the Thursday, lasting for about 12 hours. On Friday a friend referred her to the Severn Trent web-site, where she saw that the company was now saying that the water was not safe to drink. She was particularly upset because of the advice she had been given the day before, which was clearly wrong. [redacted] called the company again at about 5 pm on Friday, urging them to do something more to make sure that everyone, including elderly people [redacted], knew the water was not safe to drink.

42. In fact by this time the company had started delivering Boil Water Advice and bottled water, and loud hailer vans were touring the area warning residents to boil water before using it.

43. [redacted] received bottled water by the case from Saturday. At the same time they got a letter from the company explaining the Boil Water Advice. However, a sampler who had arrived at their home at 9 am on Saturday morning told [redacted] that the water was OK to drink.

44. [redacted] confirms that he received the Boil Water advice on Friday, together with a supply of bottled water. The letter, at pages 3 and 4 of the bundle, apologised for the worry and inconvenience caused, explained that tests had shown that water quality was not meeting expected standards, and asked customers to boil water before it was used for drinking, food preparation, teeth cleaning or ice-making. Any persons experiencing illness, particularly gastrointestinal upsets were advised to contact their GP. The letter promised that bottled water would be delivered.

Originally, the company were anticipating that the problem would last for 3 days.

45. [redacted] first heard the Boil Water Advice from the company's loud hailer vans and was later supplied with plenty of bottled water. She also kept up to date with what was happening via the company web-site.

46. [redacted], who had asked for and received some bottled water on Thursday night, also heard the loud hailer vans, and more bottled water was delivered to her home on Friday night. She was concerned that not all her elderly neighbours had got the message – and went round to see them to make sure they knew not to use the water without first boiling it.

47. [redacted] the man from [redacted] who had contacted the company on Wednesday evening at about 9, followed a loud hailer van that he saw driving round the village on Friday afternoon to find out what was being said. It was only then he heard the advice not to drink the tap water without first boiling it. He says if he hadn't chased the van, he wouldn't have known to boil the water, or understood why bottled water was later left at his premises. He had been checking the company's web-site but hadn't been able to locate the information he wanted or expected to find there. The leaflet from the company explaining the situation arrived after the bottled water. [redacted] found a stash of bottled water at the bottom of his drive on Saturday morning. He had no complaints about the quantities provided thereafter. [redacted] was disappointed that the company did not react sooner – as he says all of the Press reports indicated that the incident started on Friday – it started for him and for others like him on Wednesday. He also says he didn't know until too late of the surgery that the company had set up in the village.

48. It was at 11 pm that night that the [redacted] received the Boil Water Advice leaflet and bottled water.

49. Bearing in mind the advice he had been given when he telephoned on Thursday morning, [redacted] was surprised, when a couple of days later bottled water was delivered to his house from Severn Trent, and in quantities. Thereafter, from flyers and letters from the company and from his neighbours, he learned of the Boil Water Advice.

50. A close neighbour of the [redacted] had also noticed a problem with the water on Wednesday evening. He had drunk a glass of water with dinner, which he thought tasted odd, but the glass of water that he took up to bed with him, he said, was definitely wrong. He said it tasted like tar. He thought the water in his shower smelled agricultural. It had been raining hard, and [redacted] assumed that flood water had somehow got into his water supply. He stopped using the water, because even after boiling, it tasted unusual. Fortunately, there was bottled water in the house[redacted] telephoned Severn Trent on Thursday morning at about 11.30 am and learned that others had already been reporting discolouration or a funny smell. He didn't find the advice he was given, which was to put a glass of water in the fridge for a couple of hours, very helpful. The operator had suggested that if he did this, the water would be OK to drink. However, when [redacted] tried it, it made no difference. Although he heard the loud hailer vans on Friday afternoon, he couldn't make out clearly what they were saying, and he says that it wasn't until Saturday morning that he got his Boil Water Advice leaflet and a supply of bottled water, and knew from then what was going on. During the following week a sampler visited [redacted], and said the results would be notified, but the [redacted] heard nothing further. Even after he received the all clear [redacted] was nervous about drinking the water again and used up the stocks of bottled water he had accumulated first,

but by March 2013 when he made his witness statement he described the water as fine.

51. [redacted] She also had first noticed problems on Wednesday evening. When she made a drink of squash, she couldn't drink it as the taste was disgusting – like cow manure, she said. She tried the taps both upstairs and down, but the water was just the same. A glass of water was cloudy, and left to stand, did not clear. [redacted] that night, and she called the company at about 10 am next morning to report the taste and smell issues. She was told there were no other reports in the area and was advised to turn the stop cock off, and after 10 minutes back on, and then let the taps run for 45 minutes. [redacted] tried this and then rang the company back because the water was no better. She asked for someone to call, but says she had to ask three times before the company agreed to send anyone. A sampler arrived at 4 pm; he said the water was OK; he could not smell or taste anything wrong with it. He told [redacted] that he couldn't put a drinking ban on because he couldn't smell or taste anything wrong. He told her to calm down and that the water was safe to drink. [redacted] refused to use it, even after boiling because of the taste, [redacted] She bought more bottled water on Thursday. During Friday morning she heard the loud hailer vans saying the water was not safe to drink and to boil it before drinking it. On Saturday morning she received the Boil Water Advice letter and kept up to date with developments by going on-line. [redacted] hasn't received any test results, but the company report indicates that the sample from her home was only tested for bacteria. It was found to be contaminated with *E. coli* and coliforms.

52. [redacted] She had first noticed that the water was discoloured, like weak tea, on Wednesday evening. She didn't like the

look of it and wasn't prepared to drink it. [redacted] rang the company on Thursday morning after [redacted] complained to her that the water tasted and smelled bleachy [redacted] said theirs was discoloured. [redacted] asked for bottled water to be delivered for the residents. At first one bottle was delivered, but after a second call more bottles arrived. In due course [redacted] said far too much water was delivered, but her real beef was that 6 x 2 litre packs were far too heavy to manage, as were screw tops, [redacted] heard the loud hailer vans on Friday, giving out Boil Water Advice, but she herself had already advised [redacted] the day before not to drink the water without first boiling it. She also received the leaflet and letter from the company explaining what was going on, and Severn Trent employees visited [redacted] on 27 November to flush the pipes.

53. The majority of calls being received by Severn Trent were recorded as discolouration or unusual taste/odour. The company also received some reports of illness. . However, there were some reports which the telephone operators did not seem to be able to fit into the usual classification categories. For example, when one consumer said the smell was faintly like a hospital, the operator suggested he meant TCP, but then went on to say that TCP signified a reaction from plastic/rubber fittings and not water quality issues.

54. Severn Trent Quality Inspectors were sent to the area on Thursday morning to collect samples from customers' properties. They discerned in samples from six properties *a weak vegetable oil taste and odour*, one of those being [redacted] had reported a chemical/*petrol taste.*

55. In addition, 2 Technicians were sent out to begin gentle flushing of the network to try to remove the discoloured water from the supply system. Flushing continued for a number of hours, but the calls from consumers continued to come in.

56. It was at this stage, and because there was no on-going work within the distribution network which might account for the problem, that Severn Trent decided to investigate [redacted]

57. [redacted]

58. On 11th June 2012 a routine compliance sample from the reservoir had been found to contain 1 coliform per 100ml water. All re-samples collected from the reservoir and associated supply system returned satisfactory results. The company was unable to establish a cause for the exceedance. However the sample line was replaced as a precautionary measure and the reservoir was again prioritised for internal inspection.

59. Cells 2 and 3 had new roof membranes and improved roof drainage systems installed in 2007 after internal inspection confirmed ingress into the reservoirs.

60. Cell 2 was isolated for inspection and cleaning in October 2012. In the course of this work, it became clear that a valve on the inlet to cell 2 had failed.

61. By 22 October, however, the cleaning work was completed and after satisfactory testing, cell 2 was re-filled and returned to supply.

62. Between 9 and 15 November 2012 work was carried out on the failed inlet valve. This required excavation works, which in turn revealed a valve on a piece of main associated with the abandoned cell no. 1. The valve was believed to be closed, but because the valve could not be operated there was no way of confirming this. The excavation was left open so that the abandoned main could be cut and capped, ensuring it was disconnected. Page 5 of the bundle shows a picture of the excavation. Valve Y is the inlet valve to cell 2, valve N is the valve that could not be operated and was to be cut and capped.

63. No other works were carried out at the service reservoir before the event started on 21st November 2012.

64. It was about 3 pm on Thursday 22nd when an operative was despatched to the Broadway service reservoir to sample the turbidity at the outlet. More than 20 hours had elapsed since the first consumers' calls had been received. The technician reported elevated turbidity, with a reading of 2.14. Further readings were taken from within the 2 cells; a sample from cell 2 had a turbidity reading of 4.09 and from cell 3 of 2.18. These readings indicated a significant rise in turbidity; for example, the average turbidity for this outlet over the three week period following the event was measured as approximately 0.16.

65. This exceedance does not represent a direct risk to human health. However, the detection of elevated and unexplained turbidity should trigger an investigation into its cause.

66. The company already knew from the samples taken from consumers' taps that there was turbidity in the network. In the meantime the tests carried out on samples from consumers' premises and from the network were not bearing out the company's original hypothesis of mains disturbance, as there was an absence of significant levels of those metals that usually signify discolouration, such as iron, manganese and aluminium.

67. Because the turbidity reading was highest in cell 2, that cell was removed from supply [redacted], and in what was described by the company as a precautionary measure, cell 3 was manually dosed with chlorine tablets. Whilst chlorine may inhibit any *E. coli,* it would certainly not harm *cryptosporidia*. Nor is chlorine a treatment for turbidity. In fact, turbidity reduces the effectiveness of chlorine.

68. Turbidity readings from the outlet fell initially, but not as far as would be expected. Separate tests on the inlet main demonstrated that the problem was not upstream, but at the Broadway reservoir site itself. Despite calls reporting discolouration continuing, and the turbidity reading at the outlet increasing again, to 2.39, the company decided once again to let the system settle overnight.

69. It clearly didn't. The first of several more reports of discolouration was received at 7.20 am on Friday morning. The turbidity levels at the service reservoir were checked again, both at the outlet and from a dip sample taken from within the reservoir. Readings of 10.1 and 9 respectively were registered. This must have been a significant cause for concern - turbidity was clearly increasing in spite of the continued strategy of allowing the system to settle overnight.

70. Because it takes time for bacteriological samples to be analysed, the test results for samples collected from the reservoir on the morning of Thursday 22nd November only became available on the morning of the 23rd. These samples were found to contain 52 coliforms and 20 *E. coli* per 100 ml of water. This is far in excess of the European Directive and National requirements. Sample results from later that day also contained coliforms, although of a much lower order.

71. A further 5 samples that had been taken on 22nd November from consumers' taps were also found to contain coliforms and *E. coli*. These results indicate faecal contamination in the supply system.

72. In response to this analytical data, between 23 November and 3 December 2012, precautionary Boil Water Advice was issued to consumers in Broadway. At 10.05 am on 23rd a message advising customers of the need to boil water before drinking was put on the company's automated messaging system.

73. Distribution staff had considered by-passing the service reservoir and supplying the area with water from another source, but decided this was not an option open to them, as the additional pumping required would cause bursts. They did not, however, model any by-pass plans before dismissing that as an option to issuing the Boil Water Advice.

74. Approximately 2,100 properties required the Boil Water Advice. Pending printing and delivery of the Notices, the company organised the loud hailer vans to tour the affected area, and utilised the Press and social networking sites to notify customers of what they should do. They also organised the delivery of bottled water. They subsequently set up an incident support centre in Broadway village over the weekend to provide customers with advice and assistance. Short of knocking on every door enough times to get a response, it is difficult to see what more they could have done at this stage to alert consumers to the problem, but there have been some complaints about coverage; some consumers have said the messages from the loud hailer vans were not clear, those at work elsewhere would certainly not have heard them, and the company's website was difficult to navigate.Many have said they did not know about the incident support centre that was set up in the village centre. Most aggrieved were those who were being told, when they rang the company for advice on Wednesday and Thursday, that the water was safe to drink.

75. Further tests at Broadway reservoir on Friday, 23 November indicated the source of the turbidity was on the inlet side of the service reservoir, and that there was an unwelcome ingress of water at some point on the site.

76. There had been heavy rainfall overnight and in the preceding days. It was noted that the excavation left open after work on the inlet valve earlier that month, and other parts of the site, were flooded.

77. During the afternoon, historical site plans were consulted. These indicated that the inlet main at Broadway was originally connected to the abandoned cell no. 1. What could not be verified, because the valve could not be operated, was that the main which had been discovered during the excavation works in early November (when the faulty inlet valve on cell 2 had been replaced) was not connected to cell 2.

78. The company decided to cut and cap the main overnight, thus eliminating the possibility of this being an open connection between the abandoned cell 1 and the service reservoir. In fact when the main was cut in the early hours of the following morning, it was clear that this was not the source of the turbid water, because there was no water coming from the pipe.

79. [redacted]

80. At 9.30 pm samples collected from the reservoir earlier that day were found to contain *cryptosprodium* oocysts. The *cryptosporidium* was subsequently typed at the national reference laboratory and found to be *cryptosproridium bovis*, a parasite found in the gut of cows.

81. These continuing bacteriological failures changed the game plan – the company realised that it would be necessary to design a systematic cleaning programme for the entire mains system.

82. Another section of pipe work had been revealed in the excavation – a 3 inch asbestos cement main (see page 5, top left). This main was not identified on any of the site plans. The team managed on the following morning, this would be Saturday 24 November, to slip a collar on the main and saw turbid water leaving the pipe. They suspected this pipe was the route of the ingress and started to trace the main. The team concluded that the main was associated with the old raw water pipe work bringing water to the site from the Spring systems, and by 2.15 pm they had cut and capped the pipe. Tests thereafter, which were repeated throughout the afternoon and evening, indicated that this had done the trick.

83. There then began the process of re-filling the service reservoir from tankers and systematic cleaning of the mains system. Targeted sampling continued throughout these processes. Whilst there were isolated detections of coliforms and *cryptosporidium* from samples taken at the reservoir on 25th and 26th November, samples taken on 27th were compliant.

84. It had been agreed at the outset with health professionals that before the Boil Water Advice could be lifted, 2 days of clear sample results were required. It was not therefore until 4 December that customers were notified that the advice of the need to boil was withdrawn.

85. [redacted]. This may have been attributable to maintenance work carried out by contractors. However, contrary to company policy, valve operations were not recorded on site, so it is not possible to be conclusive about the cause.

86. Tracing the pipework had been postponed until more pressing matters had been dealt with, but in January 2013 the company confirmed that the abandoned cell 1 was connected to the 3 inch asbestos cement main that was not identified on the site plans, and that a break in this main had occurred, allowing ingress of surface run off.

87. The company concluded from this that at some time in November, after the valving work had been completed, but when the excavation was still exposed, the operation of the supply pumps at [redacted] caused a pressure wave which fractured the 3 inch main. This is a plausible theory. Equally plausible, however, is the theory that the excavation works themselves, particularly with heavy diggers being used, could have caused the fracture, as could frost.

88. During the event, staff at the Broadway site had noticed standing water, and noted water running onto the site from adjacent farm land. Water had to be pumped out of the excavation site before work to cut and cap the pipes could be started. A concrete plinth, about 5 – 10 meters from the boundary of the site, and previously used to allow access by tanker to the abandoned spring source, was being used as a holding area for cattle. This plinth is a couple of meters higher than the site.

89. When the site was inspected by DWI in December 2012, the plinth was running with thick manure/slurry. A spring-fed cattle trough within the holding area was overflowing onto the plinth and hence onto the reservoir site (see pages 6 – 7). This visit was enough for DWI Inspectors to identify the risk of contamination from the cattle-holding area. The risk ought to have been obvious to Severn Trent, but their risk assessment for the Broadway site had failed to take it into account.

90. This was by no means a carbon copy of the Ayrshire incident to which I referred earlier, but the similarities are striking. In the Scottish case, which it has to be said achieved and maintained a certain notoriety

especially amongst the water industry, because of being featured in Badenoch, a pipe which was thought to be disconnected, but was not, was allowing ingress of water contaminated by cattle slurry that had been sprayed on the catchment area. At Broadway, a connected pipe, which did not appear on site plans, fractured, allowing water contaminated with slurry from the cattle holding area to enter the reservoir.

[redacted]

93. [redacted]

[redacted]

[redacted]

Conclusion

96. DWI do not accept that the omission from its asset plans of the existence and location of a section of redundant pipe is all that

prevents the company from relying on the statutory defence (SVT letter dated 3 December 2013).

97. We say that the lack of due diligence is evidenced by a combination of factors. As well as the company's asset records being incorrect, the company operated a flawed regulatory risk assessment methodology for Service Reservoir assets.

98. DWI consider that the company had ample opportunity to have known about the risks and mitigate them. In particular, the company was working on the site in October 2012, and doing so presumably without first ensuring that all pipes and valve statuses had been checked and documented. This is bad practice. A competent operator would always assume that records may not be 100% accurate and therefore need to be checked fully prior to any non- routine operation.

99. Furthermore, the company treated its Service Reservoir assets as stand alone structures that were not potentially adversely impacted by the environment around them. Specifically, the hazard from *cryptosporidium* was not incorporated in the methodology, and the company did not visit the site to validate the risk assessment by looking at the environment around the service reservoir.

100. In addition, the company had failed to identify the risk of *cryptosporidium* at this site on more than one occasion. Firstly, they failed to do so in 1990 when this exact risk was notified to them in a government report and repeated in a DWI Information letter. The Ayrshire outbreak was due to very similar circumstances - a Service Reservoir with an underground pipe that was not capped off, close to land contaminated with cow manure and impacted by heavy rainfall.

101. Second, the company failed to incorporate this hazard into the company's regulatory risk methodology in 2007, and therefore failed to identify the specific hazard at this site in their risk assessment in 2008.

102. The company's operators (who would have visited the asset at least weekly in the 5 years since then) were apparently not sufficiently competent to identify the hazard and initiate a correction to the flawed risk assessment. The photographs taken in December 2012 show that the hazard of overflowing spring water flushing manure on to the site is very obvious – and this must have occurred on previous occasions.

103. Finally, when consumers first reported a sewage/manure smell to the water, this was not diagnosed as "unusual" and "indicative of serious contamination" warranting an immediate site visit at which the hazards might have been noted and addressed. Instead the company ignored the smell reports, treating the consumer reports on the assumption it was benign mains sediment, even though they knew that there was no network operations taking place that might have caused a disturbance of sediment in the network.

104. As a result, for a period of up to three days in November 2012, consumers in Broadway were supplied with water that was unfit for human consumption.