

## **IN THE CHESTERFIELD MAGISTRATES COURT**

### **DRINKING WATER INSPECTORATE**

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

-v-

### **SEVERN TRENT WATER LIMITED**

### **OPENING NOTE**

#### **Drinking Water Inspectorate**

1. This prosecution is brought by the Drinking Water Inspectorate (DWI) on behalf of the Secretary of State for the Environment, Food and Rural Affairs.
2. 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.
3. The Inspectorate:
  - provides independent scrutiny of companies supplying drinking water to consumers in England and Wales;
  - works together with others for the improvement of drinking water quality and to secure drinking water safety;
  - commissions research to build a sound evidence base on drinking water quality; and

- publishes data on drinking water quality in England and Wales.
4. DWI carry out technical audits of every water company. Inspectors assess water quality based on information received regularly from 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 are reliable and give a true picture of the quality of the water supplied.
  5. A typical inspection may include checks to ensure that:
    - sampling procedures are satisfactory
    - samples are tested by properly trained staff using accurate methods
    - the correct numbers of tests are carried out
    - results are accurately recorded
    - appropriate water treatment processes are used
    - treatment processes and the water distribution system are operated and maintained with safety in mind; and
    - consumers receive sound advice and help with queries and concerns.
  6. Where problems are identified, DWI will take action to ensure that the company concerned rectifies the situation.
  7. The Water Industry (Suppliers' Information) Directive 2009 requires 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

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

9. Typically, DWI seek to determine:

- What caused the problem and whether it was avoidable
- What the company's response to the problem was
- What lessons can be learned to prevent recurrence
- Whether any Regulations have been breached
- Whether an offence has been committed.

There are several typical outcomes of an event assessment:

- A letter sent to the company
- A letter to the company making recommendations for action which the company must take to address deficiencies revealed by the event
- Enforcement action initiated against the company – this is a legal process to ensure the company takes all necessary action to prevent further breaches of either a regulatory duty or a drinking water standard
- As a last resort, initiation of criminal proceedings or a formal caution.

In each case any other relevant parties are informed of the outcome.

10. 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.

11. Wholesomeness is defined in the Water Quality Regulations 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 aluminium and manganese, and
- the way water looks and how it tastes.

12. So, for example, the National Requirements are that there should be no more than 200 micrograms of aluminium per litre ( $\mu\text{l}$ ) or 50  $\mu\text{l}$  of manganese in drinking water, when measured at consumers' taps.
13. From the beginning of 2008, raw water monitoring became a regulatory requirement, and a duty was imposed on water companies to carry out comprehensive, multi-hazard, risk assessments for each treatment works and associated supply system.
14. These risk assessments are undertaken using the water safety plan approach published by the World Health Organisation. 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.
15. It is the duty of each water company 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 risk mitigation.

## **The Legal Background**

- 16. Regulation 26 (1) (a) of the Water Supply (Water Quality) Regulations** imposes a duty on water companies to *disinfect* water before it is supplied for cooking, drinking, food preparation or washing purposes.
- 17. *Disinfection*** relates to the arrangements and equipment a water company has in place to treat raw water before it is put into the supply system. The Regulations define *disinfection* as a process of water treatment to remove or to render harmless to human health every pathogenic micro-organism and pathogenic parasite that would otherwise be present in the water.
- 18.** Disinfection arrangements may be a single process of inactivation (such as chlorination, ultraviolet radiation or ozonation) or a single process of removal (such as membrane or other equivalent filtration technology) or a combination of two or more removal or inactivation processes (such as filtration followed by ultraviolet and chlorination).
- 19.** The technical performance of disinfection arrangements should target the widest possible range of pathogens – viruses, bacteria, parasites and toxic algae – that are likely to occur in the source of water being abstracted for water supply purposes.
- 20.** The choice of treatment and disinfection processes is not specified in the Regulations; companies are free to decide on the most appropriate technology to apply at each of their treatment works.
- 21.** It is expected that a water company will have in place a disinfection policy that is informed by sound science and by knowledge of the occurrence of pathogens in their water sources. Their disinfection policy should cover the design, maintenance and operation of all relevant components of the treatment works.

22. DWI expect there to be documentation and procedures in place which identify all critical controls. Companies must ensure that there is current and archived validation data for each critical control for disinfection. The disinfection policy should be kept under regular review.
23. In addition, companies are required in certain cases, by **Regulation 26 (1) (b)** to prepare water for disinfection, particularly to remove or reduce the value or concentration of any property or substance that would interfere with the disinfection arrangements.
24. Finally, **Regulation 26 (3)** also imposes a requirement on water companies to design and continuously operate an adequate treatment process, that is a process which prepares raw water for disinfection by removing properties or substances which would interfere with the disinfection process, and disinfects, i.e. removes pathogenic micro-organisms and parasites. This regulation recognises that the safety of drinking water depends on the combination of a well designed plant operated and maintained at all times by well trained operators supported by appropriate procedures.
25. **Regulation 31(2)** of the same Regulations prohibits water companies from applying substances and products to water unless they are approved, or are in conformity with national conditions of use. The Regulation is designed to ensure that water companies, when producing and distributing drinking water, only use products and substances that do not cause any detrimental effects on the safety or quality of the drinking water.
26. Breach of any part of **Regulation 26** is a criminal offence for which the maximum penalty is a fine; unlimited in the Crown Court, but subject to the statutory maximum on summary conviction.

27. These are not strict liability offences; where a water company can show that it took all reasonable steps and exercised all due diligence to avoid the commission of the offence, it has a defence.

28. In contrast, breach of **Regulation 31** is an offence of strict liability.

There is no due diligence defence. If an unapproved substance is applied to water that is supplied for cooking, drinking etc. purposes, the water company commits an offence, which again is punishable by a fine in this Court of up to £5,000.

29. **Section 70 of the Water Industry Act 1991** (as amended) creates a further offence, a more serious offence perhaps in that the maximum penalty on summary conviction (since 1 April 2004) is a fine of £20,000, of supplying water unfit for human consumption to any premises.

30. 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.

...

31. There is no statutory definition of *water unfit for human consumption*.

The best we have is to be found in the judgment of the Recorder of Leeds, HHJ Norman Jones QC in the case of DEFRA v Yorkshire Water Services Limited at Leeds Crown Court on 28 July 2000.

32. Yorkshire Water Services Limited was accused of a number of counts of supplying water unfit for human consumption. After reviewing the statutory background, legal authorities and the Hansard debates relating to the Water Industry Act, he ruled that water was unfit for human consumption if:

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.



33. It is important to note that, as for the Regulations in the main, a company may avail itself, in appropriate circumstances, of the statutory defence. Where a company pleads guilty to an offence under section 70, it is admitting not only that water unfit for human consumption was supplied to premises, 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.

## The Defendant

34. Severn Trent Water is one of the largest of the 10 regulated water and sewerage companies in England and Wales, providing services to more than 4.2 million households and businesses in the Midlands and mid-Wales. According to the 2012 Annual Report, the company's Annual Turnover is £1,457.5 million and its Gross Profit, £500 million.

**Charges 11 – 12 – Melbourne Water Treatment Works (WTW) 7.7.10**

35. Melbourne WTW abstracts raw water from two storage reservoirs [REDACTED] [REDACTED] which are fed from the river Dove. Due to the nature and presence of the storage reservoirs, the Works should not suffer from rapid changes to raw water quality.

[illegible]



with a minimum residual of 0.4milligrammes per litre (mg/l) recorded. During this period the site was therefore not in compliance with the company's own disinfection policy, which requires a minimum residual of 0.5 mg/l.

43. The low chlorine alarm was triggered at 10.52 am. The shift operator immediately contacted the maintenance team and realised what had happened. The operator went to the ejectors and switched them over, thus reinstating pre contact chlorination. It was by now 11.15 am.

44. During the afternoon the pre contact tank chlorine residuals were in and out of low alarm status, and the low chlorine residual was accepted on 7 separate occasions. The override keys were still in place having been activated for that morning's maintenance work. Although that work had stopped at 11.15 hours, it was not until almost 18.00 hours that the override was de-activated. The site log book records that the override was removed at 17.52 hours, and that the fluctuations in chlorine residuals were due to backwashing and flow changes.

45. The company's subsequent investigation of the loss of chlorine residual identified that variations in the pre contact and post contact chlorine residuals occurred almost simultaneously. When a pre contact tank chlorine spike was applied, the time difference between the pre contact chlorine residual monitor and post contact tank chlorine residual monitor registering the spike was just 4 minutes. The known retention time of the contact tank was approximately 45 minutes, depending on flow.

45. At first the company thought that the telemetry on site must be at fault, but having checked the following day, and found it to be working correctly, [REDACTED]

[REDACTED] [REDACTED]  
[REDACTED]  
[REDACTED] [REDACTED]

[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]

[REDACTED]  
[REDACTED]  
[REDACTED]

47. [REDACTED]  
[REDACTED] [REDACTED]

[REDACTED] After checking the chlorine residuals, the works was re-started.

[REDACTED] By comparing recorded chlorine residuals, it became obvious that the bypass valve had been open since 7 July 2010. The operation of this bypass meant that water had not been passing through the full controlled disinfection process, i.e. not through both compartments of the contact tank, as it was designed to do. [REDACTED]  
[REDACTED]

[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]

[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]

51. Monthly microbial samples are taken by the company at a stage in the process prior to the contact tank, but due to the limited sampling, it is

not possible to draw reliable conclusions on the quality of the water entering the disinfection system. However, between July 2010 and September 2011, 16 samples were taken; the maximum number of coliforms recorded was 34 per 100ml, and the maximum number of *E. coli* was 7 per 100 ml.

52. [REDACTED]

[REDACTED]. All samples have been compliant. However, companies cannot rely on daily 100 millilitre samples to determine whether the water has been adequately disinfected. The whole purpose of Regulation 26 is to define adequate disinfection through compliance with local disinfection policies and triggers. One has to bear in mind that sampling captures no more than a snapshot in time of a tiny proportion of the water going into supply.

53. To conclude its investigation, an interview under caution was conducted by DWI [REDACTED]

[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]

[REDACTED]  
[REDACTED]  
[REDACTED]

55. He agreed also that during the event on the 20 September 2011, the company failed to meet their own disinfection criteria which constituted a disinfection failure.

56. [REDACTED] said the event was a serious breakdown in process control and that Melbourne was not continuously operated in the manner it was originally designed.

57. The company had learned lessons. [REDACTED]  
[REDACTED] The company's design manual for disinfection was updated. New local systems for disinfection overrides were compiled. At Melbourne WTW, the system of work for maintenance of the chlorine dosing ejectors was tightened up.

#### **Charges 13 – 16 Sandiacre 27.12.10**

[REDACTED] On 27 December 2010 Severn Trent Water carried out an emergency repair of a burst water main on [REDACTED]. Following this work, over 3 consecutive days, a total of 29 consumer contacts relating to taste and odour issues were received from [REDACTED]  
[REDACTED]

[REDACTED] Consumers variously described the water as being discoloured and/or having a sulphurous or "sewage" nature. Two of the callers reported illness, although no causal link to the water was ever confirmed [REDACTED]  
[REDACTED]  
[REDACTED]

60. The company also received 7 written complaints relating to this event during December.

61. The burst had occurred close to the highest point in the district metered area (DMA), a point referred to by the company as the critical point. In order to minimise interruptions to supply, pressure was initially maintained in the main whilst the burst was located, although flow was reduced or throttled back to minimise flooding. This resulted in some

properties in the DMA experiencing poor pressure and some loss of supply. In order to minimize further loss of supplies, the Company supplied water from another supply area by a process of rezoning. The main was eventually fully depressurised and isolated to allow the damaged area of the main to be cut out and a new section inserted.

62. The distribution operative who first arrived on site on 27 December states that he remembered a "*smell of gas*" when the excavation had been dug. The gas and sewer mains were a significant distance from the excavation. The Supervisor attributed the smell to clinker material within the road's sump surface.
63. The company had recognised that the risk of discolouration to supply, in view of the work involved, was high.

#### **The Charges**

64. [REDACTED]  
[REDACTED]  
[REDACTED] lost supply totally and went to ask the workmen who he saw working nearby when his supply would be restored. He noticed a very strong smell of sewage or bad eggs near the excavation. He described the smell as unbearable and unmistakeable and thought the workmen must have fractured a sewage pipe.
65. When his water was restored, it too smelled of sewage. For the next few weeks [REDACTED] bought bottled water as he wasn't prepared to drink water from the tap. He drew off a sample to give to the company to analyse and describes that as cloudy white with floating particles and smelling strongly of sewage. The particles settled out when the water was left to stand.

66. A Severn Trent employee who came to collect samples from the tap [REDACTED] recoiled when he turned the water on, saying, there is something wrong with that.

67. [REDACTED] says the smell went on for about three weeks, during which time he couldn't wash with the water, as a shower or bath made the house smell.

68. He later received a letter from Severn Trent telling him the water had not been contaminated.

69. [REDACTED] found that hard to believe and felt the company were not taking his complaint seriously. His says his confidence in the water was knocked for a few weeks after the incident.

[REDACTED]  
70. [REDACTED]. She first noticed a problem when she opened her washing machine to empty it, and it smelled of sewage.

71. [REDACTED] wouldn't drink the water, and nor, she says, would the lady from Severn Trent who came to her house to collect a sample for analysis. [REDACTED] says she was given no advice about how safe the water was, and wasn't offered any bottled water.

72. It was several days before the smell, which was really bad in the bath and shower, cleared.

73. [REDACTED] did not receive any feedback from Severn Trent about the set of samples that were taken from her house.

[REDACTED]  
74. The owner of [REDACTED] Street was approached by a neighbour with a sample of his tap water which smelled like a stagnant drain, was brown



and looked disgusting. At that stage the water at [REDACTED] appeared to be OK, but shortly thereafter as lemonade bottles were being filled for the neighbour, the water turned misty and sludgy and smelled really bad. The water was the colour of nicotine stains and could not be used over the course of the next three days for drinking or washing.

75. Severn Trent's suggestion when they were contacted, that the colour was caused by chlorine, was immediately discounted.

76. Severn Trent did not offer any bottled water, and the family bought bottled water for 6 days to make up baby formula for their infant. It was a fortnight before they stopped checking the water carefully every time they turned the tap on.

[REDACTED]

77. [REDACTED] had her daughter and family staying with her over Christmas and noticed when she tasted a cup of coffee she had made on Saturday morning that there was something wrong with the water. She describes the taste and smell as like TCP.

78. This didn't stop [REDACTED] using the water for bathing, but she was not prepared to drink it. She contacted Severn Trent, but was unhappy with the service she received. She was told the Manager she had asked for was too busy to speak to her, and when she asked for bottled water, the company said it would be very difficult to provide any because of the holiday period. [REDACTED] ended up buying her own bottled water because for two or three weeks she was not prepared to drink the tap water.

79. In reaction to these and other complaints of discoloured water and unusual taste and odour, the Company carried out localised systematic flushing.

80. Bottled water was supplied to some, including the residents of the affected apartment building, and a Regulations and Fittings inspection was carried out there.

81. Laboratory analysis of samples taken from the affected area showed levels of iron, manganese, aluminium, lead and turbidity above the prescribed concentrations or values, and low level concentrations of sulphur in samples taken at customer taps. All microbiological sample results were satisfactory.

82. The Company carried out a number of other investigations thereafter to determine what had happened. Mobilised stagnant water from abandoned assets was considered, but ruled out following checks on valve status in the relevant areas. It was concluded in the company's 20 Day Report to DWI (the first of two) that the most likely source of the taste and odour was back-siphonage of road fill material, known commonly as "clinker", a theory which the company later verified using tests carried out on a trial pit under controlled conditions. Effectively, the company was saying that road fill or clinker had entered the main when part was cut out for the repairs.

83. However, in an interview under caution with the [REDACTED] on 25 November 2011, DWI were told that following a full review of the event, presumably in preparation for the interview under caution, the Company's conclusions had changed, and that the origin of the taste and odour complaints was standing water which was mobilised during localised changes in mains flow and pressure.

84. The [REDACTED] said that the information provided to DWI in the 20 day report was the result of inaccurate assessment of conditions on the ground. He had not been involved with the event at the time; his involvement was much more recent, focussing on the recent review and changed conclusion.

85. The Company did not accept that they had supplied water that was unsafe during this event on account of the change of their conclusion of the cause (i.e. not back siphonage of water containing road clinker, as previously stated in the initial 20 day report).
86. DWI's investigation leading up to the interview under caution, which involved interviewing a number of members of staff from Severn Trent, had been predicated on the basis of the company's 20 Day Report. What they heard at the interview under caution, and this was 11 months after the incident, therefore came as a bit of a shock. DWI requested the company to provide a new Report to replace the original 20 Day Report.
87. Following submission of a second 20 day report, based on the company's revised cause, DWI conducted a second interview under caution with Severn Trent in January 2012. On this occasion the company was represented by the [REDACTED].
88. She confirmed that in preparation for the first interview under caution, the company had unpicked the event in its entirety and realised their original conclusions were wrong. She apologised on the company's behalf for its earlier errors.
89. Severn Trent were not able to identify where the specific area of standing water that was mobilised would have come from, but they were satisfied that the wrong conclusion had been reached because the hydraulics of the system had not been completely understood. Also the water quality data from sampling had not been accurately and thoroughly reviewed in compiling the first 20 Day Report.
90. The Company accepted that the water supplied to customers at the time of the event was unwholesome, and also, based on consumer

rejection, that it was unfit for human consumption. However, the Company did not consider that the water was not safe to drink.

#### **Charges 1 - 10 Ogston Water Treatment Works 23.8.11**

91. During September 2011 customers in the [REDACTED] area experienced the supply of water containing elevated levels of manganese. This manifested itself as discoloured water (purple through to brown/green) and persisted for three days for some consumers and up to three weeks for others.

92. In total, the company received 231 calls which were addressed by the call centre staff, whilst 1,342 calls were logged on its messaging system.

93. Investigations by Severn Trent Water showed that the discolouration had been caused by work carried out in regenerating carbon in a granular activated carbon (GAC) filter at Ogston WTW, and the return to service of the filter.

[REDACTED]  
[REDACTED]

[REDACTED]  
[REDACTED]  
[REDACTED]

96. On 1 August 2011 media from GAC adsorber number 4 was removed and sent to [REDACTED] for regeneration. During the period that GAC adsorber 4 was empty, a problem with flow was experienced in GAC adsorber 5. In order to investigate this problem, adsorber 5 was isolated from supply and the carbon in it was transferred to adsorber 4. The carbon was then backwashed and returned to supply. When adsorber 5 was repaired, the carbon was returned to it from adsorber 4, although adsorber 5 was not put back into service immediately.

97. A few days later and in accordance with company procedure, the process of returning adsorber 5 to service commenced. Within 30 minutes low chlorine and high pH alarms were received, but none were serious enough to result in an automatic works shut down.
98. About 5 hours later a further low chlorine alarm was registered. Each of these events coincided with a backwash of adsorber 5. At 5 pm that day, after opening the manual valve pre contact tank, an operative noticed that, unusually, the water in the filter was cloudy. Adsorber 5 was isolated from supply.
99. The pre contact tank chlorine residual was 0.0 mg/l for two 10 minute periods on the 23 August, the post contact chlorine residuals were below 0.9 mg/l, and the contact value (Ct) was less than the site target of 20 mg.min/l for approximately 10 minutes. Further, the post contact chlorine residual was out of range between 17.43 and 18.18 hours. This, by the company's own disinfection policy, demonstrates a failure to disinfect – a breach of regulation 26(1)(a).
100. The pre contact pH reached approximately 9 on one occasion on 23 August. Elevated pH is known to interfere with disinfection; and this reading demonstrates that the company failed to subject the water to sufficient preliminary treatment to prepare it for disinfection – a breach of Regulation 26(1)(b).
101. Subsequent investigations revealed that the effect on the chlorine was most likely a build up of ammonia on the GAC filter, caused by the GAC being left standing between repair and being put back into service.
102. Severn Trent tried again on the next day after further backwashing, but once again the GAC had to be isolated from supply as the pre contact pH was starting to rise. A successful restart only proved

possible when flow was restricted to 2MI/d, rather than the usual 9MI/d.

103. On 1 September the company received 33 discolouration complaints.

There were no known bursts, rehabilitation work or network activity that could account for these. But a routine sample from Ogston WTW taken on 30 August disclosed a substantial breach of the PCV for manganese. The company commenced an extensive sampling survey.

104. Meanwhile during a routine change of the cryptosporidium filter at

Ogston, it was seen to be visibly discoloured. This had not been seen before. The manganese level on GAC 5 was more than 30 µg/l, although that was the highest value the field equipment could reliably read. Site operators were instructed to carry out regular checks of manganese levels using handheld instruments which were more reliable.

105. The company had previously determined that there was a risk of high levels of manganese in the raw water, and so had installed continuous manganese monitors on the raw water supply to the site. At the time of the event, however, these had been decommissioned, although the company have been unable to explain why. It meant that no on site testing for manganese was being undertaken.

106. By lunchtime on the next day emergency analytical results were available showing that out of 27 samples, 16 breached the standard for manganese.

107. 105 samples were taken from Ogston treatment works, downstream reservoirs and consumers' taps between the 2 and 9 September. 30 samples breached the requirements of the Water Quality Regulations for manganese. The highest result, which was recorded in the final water at Ogston works on the 30 August 2011, was 216 µg/l., compared with the standard for manganese of 50µg/l.

108. The treatment works was inadequately designed to remove manganese which occasionally occurred in the raw water as the company failed to have in place any effective mitigation measures. Consequently, manganese was adsorbed onto the GAC. When the GAC was returned to service, the loosely bound manganese leached into the final water causing discolouration within the distribution system. This was in contravention of the conditions of use which require that all readily leachable material that may cause an adverse effect on the quality of water should be removed by adequate backwashing.
109. The company had failed to design an adequate works as there was an ineffective process for removal of manganese before the GAC stage and also because insufficient provision had been made to adequately backwash a filter being returned to service following GAC regeneration.
110. In addition, insufficient testing for manganese was being carried out, because the monitors originally installed did not work reliably. The company now test for manganese on a daily basis, a new monitor having been installed. Although GAC should be tested for any substance which may leach before being returned to service, at Ogston testing was only undertaken for pH, chlorine demand and odour. In fact there should have been a test for iron because ferric-based coagulants were used in the process, as well as a test for manganese.

## The section 70 offences

111. [REDACTED]

[REDACTED] They first noticed a problem at their home when they ran a bath for the children and the water was walnut coloured [REDACTED] [REDACTED] emptied the bath and ran it again, but the water was just the same. On the following day, the water was still brown and dark brown sand-like particles could be seen. [REDACTED] contacted Severn Trent and was advised the water was safe to drink, and that the particles would be sediment or rust from pipes which were being re-laid. He doesn't usually drink tap water, but his wife and children do, and his wife was reassured by what they had been told.

112. Over the next couple of days, the water got much darker, [REDACTED] [REDACTED] contacted the company again. He was told on this occasion that there was a problem at Ogston works which had resulted in high levels of manganese in the water, but he was again assured that the water was safe to drink. However, by this time [REDACTED] [REDACTED] was feeling poorly, and the two children had suffered sickness and diarrhoea. [REDACTED] was sick herself and had to take time off work, and her 4 year old daughter was off school for a week [REDACTED], who had been drinking only bottled water and was not ill, says he had to take time off work to look after everyone else. He also took a video of the water, although not, he says when it was at its worst. He downloaded this to a CD which he provided to [REDACTED] DWI and still photos are available from the video.

113. He called Severn Trent again during this period, and was again told that the water was safe to drink and was being monitored, but [REDACTED] [REDACTED] went out and bought bottled water, which the family used for drinking, cooking and to wash the children.



114. [REDACTED]  
[REDACTED]. She first noticed staining and discolouration in the toilet bowl. She ran the bath and found the water from the taps was just the same – dark orangey brown. She checked the kitchen taps too, with the same result. She was concerned whether the water was safe, although because of its colour she wasn't prepared to drink it.
115. [REDACTED] contacted Severn Trent, and was advised to let the water run to waste for 20 minutes at a time until it ran clear. She tried this to no avail; the discoloured water went on for several days. She checked with two of her neighbours and discovered they were in the same position.
116. [REDACTED] was advised by Severn Trent that the water was safe to drink, but she was not reassured by this and went out and bought bottled water to use for drinking, cooking and cleaning her teeth.
117. [REDACTED]  
[REDACTED], noticed the water he was running for a bath was a muddy brown colour. He tried the kitchen tap, where the water was just the same. He was concerned as his 14 month-old son had suffered a serious water infection when he was 6 months old.
118. [REDACTED] rang Severn Trent for advice. He was told the water was safe to drink, and that he should run the taps for 20 minutes. [REDACTED]  
[REDACTED] was not persuaded to drink the water and he too bought bottled water which he used for drinking, cleaning his teeth and bathing his son.
119. The family took their laundry to a relative's house as they were afraid it would get stained.

120. It was 3 or 4 days before the water ran clear, and the [REDACTED] were able to resume normal use. During this period [REDACTED] contacted Severn Trent several times as he was anxious to have the matter resolved. When he made his statement, in January this year, some 4 months after the incident, he still had no confidence in the water.

121. [REDACTED]  
[REDACTED] was about to shave when he noticed the water in the bathroom basin was a brown/green colour. He had noticed too that his goldfish were docile and not feeding as usual.

122. He contacted Severn Trent and was told that they were dealing with a problem with filtration at the reservoir that had been going on for 4 days. [REDACTED] says there was no way he would have drunk the water, and he went out to buy bottled water which he also used to replace the water in the fish-tank.

123. His children had had upset stomachs, which [REDACTED] attributes to the water, although they were not so unwell that they had to be taken to the doctor. [REDACTED] requested Severn Trent to analyse a sample from his taps, but was unhappy that it took the company 9 days to arrange this, by which time the water was clear.

124. [REDACTED]  
[REDACTED], noticed that the water coming from her taps looked like urine, although it had no smell. When she first contacted Severn Trent, she was advised to flush the taps for 30 minutes, which she tried, but that made no difference. Severn Trent told her that they were working on nearby mains.

125. When she called again, [REDACTED] was told there was a problem at the reservoir. Although she kept flushing, the water, which had by

now gone to a mucky brown colour, did not run clear. When using the shower, [REDACTED] said it felt as if she had been on the beach.

126. [REDACTED] specifically asked during these calls about whether the water was safe, particularly for her young baby. Severn Trent said that she shouldn't use her washing-machine, as her clothes might become stained, but that the water was safe, even for the baby. [REDACTED] decided not to drink it, and Severn Trent provided her with some bottled water, which she supplemented with water she got from her mother-in-law's house.

127. Unfortunately [REDACTED], to be fair, says that might have been because she had just started nursery. The matter came to an end for her because the family went away on holiday, and by the time they returned home, the water was back to normal. [REDACTED] was subsequently diagnosed with gastroenteritis, necessitating several doctors and hospital appointments and involving a lot of sickness and diarrhoea.

128. [REDACTED]  
[REDACTED]. She describes the water supplied to her home during this incident as bright orange. When her husband rang Severn Trent to ask for bottled water for their baby, he was told that babies shouldn't be given bottled water as the mineral content was too high. Severn Trent couldn't provide tap-water from another source for them because a large area was affected by the problem, although [REDACTED] managed to collect water for drinking and washing from her mother's house about 2 miles away.

129. The orange water lasted for about a day, although after a couple more days the water turned brown. [REDACTED] and her husband have been put off drinking tap water unless it has first been boiled, preferring instead to buy bottled water to drink.

130. [REDACTED]  
[REDACTED]  
[REDACTED]

131. They agreed that the processes and procedures at Ogston works were not adequate for the manganese challenge presented by the raw water. The underlying cause of this event, they admitted, was inadequate manganese monitoring. They accepted that Regulation 26(3) had been breached.

132. With hindsight, they were prepared to accept that GAC vessel 5 was not adequately backwashed or tested prior to its return to service.

133. The company accepted that unwholesome water had been supplied, and based on the fact that consumers had rejected the water, that water unfit for human consumption had been supplied. However, they maintained that the water had not presented a risk to public health.

134. DWI were informed that since and in response to the event, improved monitoring for manganese and chlorine was put in place, water quality bulletins regarding carbon regeneration generally and this event specifically were to be issued to all staff, the GAC return to service procedure had been improved and the investigation findings had been disseminated to all technical operators. Severn Trent Water was confident that nothing like this would happen again.