

## 2009 Treated Water Quality Monitoring Results

7,913 water quality analyses were undertaken during 2009, of which 7,902 were compliant. This gives an overall compliance level of 99.86%.

### Notes relating to the interpretation of the tables: -

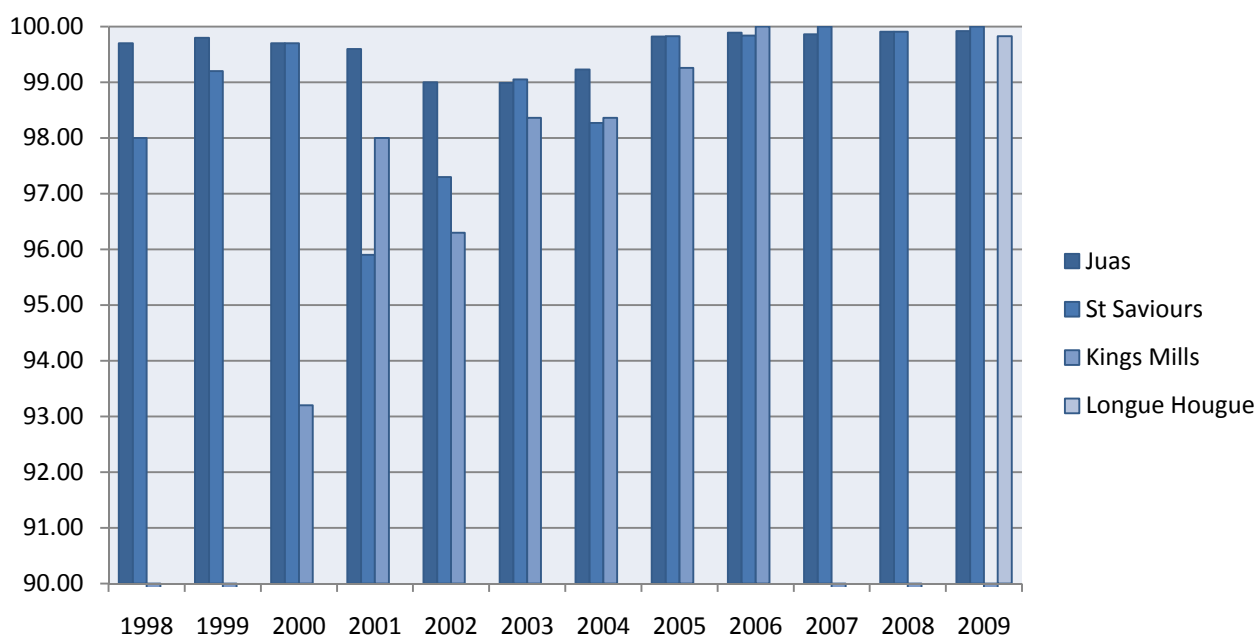
Columns on the following tables that are headed '1 percentile representing a minimum' and '99 percentile representing a maximum' contains figures for the 1 percentile and 99 percentile sample results respectively, except where less than 100 samples were taken, when the figures are the actual maximum and minimum results.

The symbol < indicates that the result was less than the limit of detection of the analytical method used.

The symbol > indicates that the result was above the recording range of the analytical method used.

### Individual WTW's Compliance

The following graph illustrates the individual Water Treatment Works (WTW's) compliance levels for the years 1998 to 2009.



Kings Mills WTW's was not used in 2007, 2008 or 2009 and Longue Hougue WTW's was commissioned in 2009.

The following tables (Tables A to G) show the results of the check monitoring programme from the Island's WTW's and Service Reservoirs together with the percentage compliance for the individual parameters monitored (the results of the audit monitoring can be found in the appendix section).

**Table A**  
**Check monitoring: St Saviours WTW's**

Substances and Parameters	99 percentile (representing a maximum)	Specific concentration or value (maximum) or state	% Compliance
<i>E.Coli</i>	0	0 per 100ml	100
Coliform Bacteria	0	0 per 100ml	100
Colony counts after 48 hours at 37°C	2	No abnormal change	n/a
Colony counts after 72 hours at 22°C	1	No abnormal change	n/a
Nitrite	<0.03	0.1 mg NO <sub>2</sub> /l	100
Residual Disinfectant	0.6	No value mg Cl <sub>2</sub> /l	100
Turbidity	0.6	1 NTU	100
<i>Clostridium perfringens</i>	0	0 per 100ml	100
Conductivity	610	2500 µs/cm	100

**Table B**  
**Check monitoring: Juas WTW's**

Substances and Parameters	99 percentile (representing a maximum)	Specific concentration or value (maximum) or state	% Compliance
<i>E.Coli</i>	0	0 per 100ml	100
Coliform Bacteria	0	0 per 100ml	100
Colony counts after 48 hours at 37°C	5	No abnormal change	n/a
Colony counts after 72 hours at 22°C	10	No abnormal change	n/a
Nitrite	<0.03	0.1 mg NO <sub>2</sub> /l	100
Residual Disinfectant	0.85	No value mg Cl <sub>2</sub> /l	100
Turbidity	0.3	1 NTU	100
<i>Clostridium perfringens</i> <sup>(1)</sup>	1	0 per 100ml	96.9
Conductivity	622	2500 µs/cm	100

<sup>(1)</sup> The *Clostridium perfringens* failure was investigated and repeat samples taken. The investigation did not discover any failures in the treatment process and all the repeat samples passed.

**Table C**  
**Check monitoring: Longue Hougue WTW's**

Substances and Parameters	99 percentile (representing a maximum)	Specific concentration or value (maximum) or state	% Compliance
<i>E.Coli</i>	0	0 per 100ml	100
Coliform Bacteria	0	0 per 100ml	100
Colony counts after 48 hours at 37°C	1	No abnormal change	n/a
Colony counts after 72 hours at 22°C	14	No abnormal change	n/a
Nitrite	<0.03	0.1 mg NO <sub>2</sub> /l	100
Residual Disinfectant	0.7	No value mg Cl <sub>2</sub> /l	100
Turbidity <sup>(2)</sup>	0.3	1 NTU	98.3
<i>Clostridium perfringens</i>	0	0 per 100ml	100
Conductivity	710	2500 µs/cm	100

<sup>(2)</sup> The turbidity failure was investigated and the investigation showed the sample failure was a result of a build up of kalic in the pipe work and the samples were not a representation of the water leaving the treatment works.

**Table D**  
**Check monitoring: No.2 Service Reservoir (East Compartment)**

Substances and Parameters	Maximum level detected	Specific concentration or value (maximum) or state	% Compliance
<i>E.Coli</i>	0	0 per 100ml	100
Coliform Bacteria	0	0 per 100ml	100
Colony counts after 48 hours at 37°C	4	No abnormal change	n/a
Colony counts after 72 hours at 22°C	23	No abnormal change	n/a
Residual Disinfectant	0.15	No value mg Cl <sub>2</sub> /l	100

**Table E**  
**Check monitoring: No.2 Service Reservoir (West Compartment)**

Substances and Parameters	Maximum level detected	Specific concentration or value (maximum) or state	% Compliance
<i>E.Coli</i>	0	0 per 100ml	100
Coliform Bacteria	0	0 per 100ml	100
Colony counts after 48 hours at 37°C	5	No abnormal change	n/a
Colony counts after 72 hours at 22°C	18	No abnormal change	n/a
Residual Disinfectant	0.1	No value mg Cl <sub>2</sub> /l	100

**Table F**  
**Check monitoring: No.2 Water Tower**

Substances and Parameters	Maximum level detected	Specific concentration or value (maximum) or state	% Compliance
<i>E.Coli</i>	0	0 per 100ml	100
Coliform Bacteria <sup>(3)</sup>	1	0 per 100ml	98.1
Colony counts after 48 hours at 37°C	5	No abnormal change	n/a
Colony counts after 72 hours at 22°C	41	No abnormal change	n/a
Residual Disinfectant	0.2	No value mg Cl <sub>2</sub> /l	100

<sup>(3)</sup> The bacteriological failure resulted in immediate re-samples. Repeat samples were taken to try to determine the source of the bacterial contamination. As a precautionary measure residual disinfection levels were raised in the reservoir and an integrity inspection carried out.

**Table G**  
**Check monitoring: Frie Plaidy Service Reservoir**

Substances and Parameters	Maximum level detected	Specific concentration or value (maximum) or state	% Compliance
<i>E.Coli</i>	0	0 per 100ml	100
Coliform Bacteria <sup>(4)</sup>	1	0 per 100ml	98.0
Colony counts after 48 hours at 37°C	60	No abnormal change	n/a
Colony counts after 72 hours at 22°C <sup>(4)</sup>	>300	No abnormal change	n/a
Residual Disinfectant	0.25	No value mg Cl <sub>2</sub> /l	100

<sup>(4)</sup> The bacteriological (coliform and high colony count) failures were investigated and chlorine residuals increased. Re-samples were taken to try to confirm the source of the contamination. A system to increase circulation within the tank and directly boost chlorine residuals was installed in 2009 to further improve bacteriological quality.

## Water Quality in the Distribution System

In 2009 some 2,478 tests were carried out on water samples which were taken from all parts of the distribution system. The samples were analysed for physical, bacteriological and chemical parameters. The following tables (Table G & H) show the results of the check and audit monitoring programmes and the percentage compliance.

**Table H**  
**Check monitoring: Supply Zone**

Substances and Parameters	Specific concentration or value (maximum) or state	1 percentile (representing a minimum)	Mean	99 percentile (representing a maximum)	Number of Samples	% Compliance
<i>E.coli</i>	0 per 100ml	0	0	0	193	100
<i>Clostridium perfringens</i>	0 per 100ml	0	0	0	102	100
Coliform bacteria <sup>(5)</sup>	0 per 100ml	0	1	1	193	98.4
Colony counts after 48 hours at 37°C	No abnormal change	0	6	142	133	n/a
Colony counts after 72 hours at 22°C	No abnormal change	0	16	>300	133	n/a
Residual disinfectant	No value mg Cl <sub>2</sub> /l	<0.05	0.10	0.25	113	100
Turbidity	4 NTU	0.03	0.09	0.19	113	100
Conductivity	2500 µs/cm	526	593	671	113	100
Colour	20 mg/l Pt/Co	<5	<5	<5	113	100
Hydrogen ion	10.0 pH value 6.5 (min)	6.89	7.38	7.78	113	100
Ammonium	0.5 mg NH <sub>4</sub> /l	<0.01	0.01	0.02	112	100
Nitrate	50 mg NO <sub>3</sub> /l	17.6	26.8	46.6	98	100
Nitrite	0.5 mg NO <sub>2</sub> /l	<0.03	<0.03	<0.03	45	100
Aluminium	200 µg Al/l	10	43	107	111	100
Iron	200 µg Fe/l	10	13	35	112	100
Manganese	50 µg Mn/l	10	12	29	112	100

<sup>(5)</sup> The bacteriological failures were investigated and repeat samples taken from the properties and feeding water main. The investigations showed that the failures in most cases had arisen from the internal plumbing of the properties.

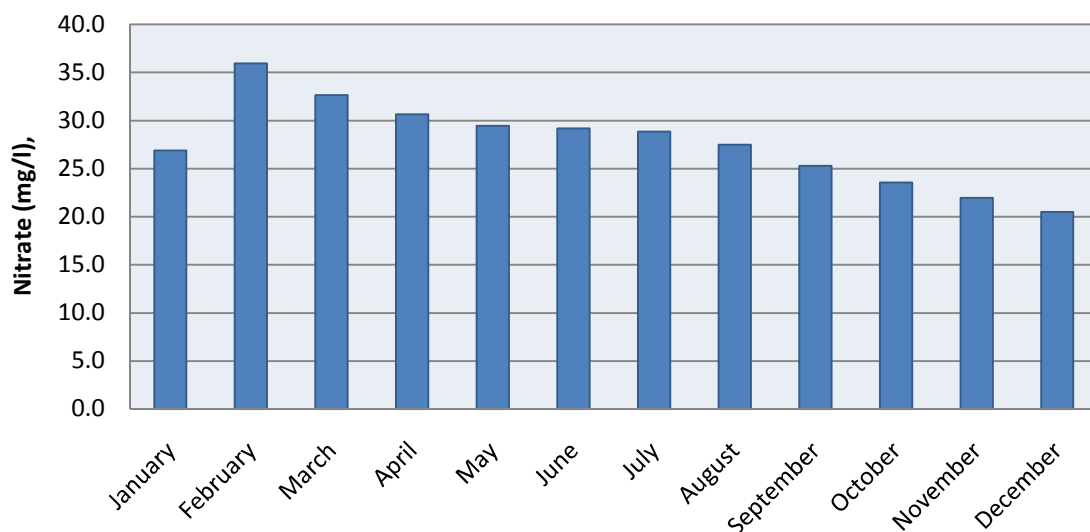
**Table I**  
**Audit monitoring: Supply Zone**

Substances and Parameters	Specific concentration or value (maximum) or state	Min	Mean	Max	Number of Samples	% Compliance
Antimony	5 µg Sb/l	0.09	0.78	1.60	36	100
Arsenic	10 µg As/l	0.07	0.82	1.35	36	100
Cadmium	5 µg Cd/l	<0.07	<0.07	<0.07	36	100
Chromium	50 µg Cr/l	0.16	0.46	0.85	36	100
Copper	2000 µg Cu/l	10	32	186	44	100
Benzo(a)pyrene	0.01 µg/l	<0.00005	0.00049	0.0005	39	100
Enterococci	0 per 100ml	0	0	0	41	100
Lead	25 µg Pb/l	<5	<5	<5	45	100
Nickel	20 µg Ni/l	0.3	2.55	18.5	36	100
Polycyclic aromatic hydrocarbons	0.1µg/l	0	0.00141	0.0079	39	100
Selenium	10 µg Se/l	0.2	1.79	2.7	36	100
Trihalomethanes <sup>(6)</sup>	100 µg/l	3	63.2	120	41	92.7

<sup>(6)</sup> The trihalomethane (THM) failures resulted from increased chlorine residuals to ensure bacteriological quality was not compromised. The philosophy for chlorination at treatment works and booster chlorination at service reservoirs has undergone changes in 2009 which should lead to a reduction in THM levels.

## Nitrates

Nitrate levels in water remain unchanged throughout the treatment processes that operate in Guernsey, as such careful monitoring of stream and stored water is undertaken to ensure compliance of treated water values with regard to the 50 mg/l maximum allowable concentration. The results below show complete compliance with regard to this particular parameter as sampled at consumer taps in the supply zones.



## Water Quality Queries

During 2009, Guernsey Water received 199 queries from customers relating to the quality of their water supply. The following tables show the break-down of these queries.

Samples taken as a result of customer queries undergo the necessary physical, bacteriological and chemical analyses and a detailed report is sent to the customer. In the majority of cases action is successfully implemented within a minimum time period. In the 3 cases where illness has been reported none of the sample results indicated that the water supply had in any way been responsible.

Type of query	Number
Iron discolouration	45
Other discolouration	4
Air	12
Sediment / bits	7
Taste / Odour	123
Illness	3
Water Quality concern regarding pets and other animals	2
Animalcules	1
General conditions ie tap or fitting	2
<b>Total</b>	<b>199</b>

The number of taste and odour complaints in 2009 was over a 5 fold increase from 2008. This was due to the storage reservoirs that serve both the north and south of the Island experiencing algal die off that caused an earth taste to be present in the water.

## Appendices

### Audit Monitoring: St Saviours WTW

Substances and Parameters	Specific concentration or value (maximum) or state	Min	Mean	Max	Number of Samples	% Compliance
Benzene	1 µg/l	<0.107	<0.12	<0.12	8	100
Boron	1 mgB/l	<0.000002	0.00007	0.00012	8	100
Bromate	10 µgBrO <sub>3</sub> /l	0.2	0.24	0.4	8	100
Chloride	250 mgCl/l	76	83	90	8	100
Cyanide	50 µgCN/l	0.003	0.01	0.03	8	100
1,2 Dichloroethane	3 µg/l	<0.10	<0.10	<0.12	8	100
Fluoride	1.5 mgF/l	<0.1	0.11	0.12	8	100
Mercury	1 µg/l	<0.002	0.006	0.016	8	100
Sulphate	250 mgSO <sub>4</sub> /l	76	91	98	8	100
Tetrachloromethane	3 µg/l	<0.07	<0.07	<0.1	8	100
Total Organic Carbon	No abnormal change	2.0	2.94	4.85	83	100
Trichloroethene / tetrachloroethene	10 µg/l	<0.1	<0.2	<0.2	8	100
Tritium	100 Bq/l	<10	<10	<10	8	100
Gross alpha	0.1 Bq/l	<0.0248	<0.0248	<0.0248	8	100
Gross beta	1 Bq/l	0.0172	0.14	0.19	8	100

### Audit Monitoring: Juas WTW

Substances and Parameters	Specific concentration or value (maximum) or state	Min	Mean	Max	Number of Samples	% Compliance
Benzene	1 µg/l	<0.07	<0.12	<0.12	4	100
Boron	1 mgB/l	0.00007	0.00009	0.00011	4	100
Bromate	10 µgBrO <sub>3</sub> /l	<0.2	<0.2	<0.2	4	100
Chloride	250 mgCl/l	78	79	81	4	100
Cyanide	50 µgCN/l	<0.002	0.004	0.01	4	100
1,2 Dichloroethane	3 µg/l	<0.10	<0.10	<0.12	4	100
Fluoride	1.5 mgF/l	0.11	0.12	0.12	4	100
Mercury	1 µg/l	0.002	0.01	0.025	4	100
Sulphate	250 mgSO <sub>4</sub> /l	86	92	98	4	100
Tetrachloromethane	3 µg/l	<0.07	<0.1	<0.1	4	100
Total Organic Carbon	No abnormal change	2.60	3.97	5.46	45	100
Trichloroethene / tetrachloroethene	10 µg/l	0.08	0.13	0.2	4	100
Tritium	100 Bq/l	<10	<10	<10	4	100
Gross alpha	0.1 Bq/l	<0.0248	0.0270	0.0335	4	100
Gross beta	1 Bq/l	0.155	0.197	0.215	4	100

### Audit Monitoring: Longue Hougue WTW

Substances and Parameters	Specific concentration or value (maximum) or state	Min	Mean	Max	Number of Samples	% Compliance
Benzene	1 µg/l	<0.07	<0.07	<0.12	4	100
Boron	1 mgB/l	0.00007	0.00009	0.0001	4	100
Bromate	10 µgBrO <sub>3</sub> /l	0.6	0.75	1.0	4	100
Chloride	250 mgCl/l	92	93	95	4	100
Cyanide	50 µgCN/l	<0.001	0.006	0.01	4	100
1,2 Dichloroethane	3 µg/l	<0.10	<0.12	<0.12	4	100
Fluoride	1.5 mgF/l	0.10	0.11	0.12	4	100
Mercury	1 µg/l	0.002	0.091	0.330	4	100
Sulphate	250 mgSO <sub>4</sub> /l	104	111	125	4	100
Tetrachloromethane	3 µg/l	<0.07	<0.07	<0.1	4	100
Total Organic Carbon	No abnormal change	2.07	2.84	5.40	54	100
Trichloroethene / tetrachloroethene	10 µg/l	<0.07	<0.17	<0.2	4	100
Tritium	100 Bq/l	<10	<10	<10	4	100
Gross alpha	0.1 Bq/l	<0.0248	<0.0248	<0.0248	4	100
Gross beta	1 Bq/l	0.199	0.221	0.236	4	100