

South Tipperary County Council



Drinking Water Monitoring Programme Public Water Schemes

Report

For the year

2007

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Key Points and Recommendations

- ❖ There was a slight improvement in overall compliance during 2007 from 97.24 % compliance in 2006 to 98.34% in 2007. This was a good achievement given the very difficult weather conditions encountered during the year.
- ❖ Compliance with the key *Table A Microbiological Parameters* Escherichia coli and Enterococci was good during 2007
- ❖ Compliance with the Regulations is being dragged down significantly by the continuing poor compliance rate for aluminium at Galtee Regional, Ardfinnan and in particular Dundrum Regional where the level of noncompliance reached 70% due to difficulties with plant operation.
- ❖ No sample taken during 2007 contained Fluoride at a level above the maximum admissible concentration, however the HSE are likely to remain concerned about the extent and duration of fluoridation shut downs
- ❖ Trihalomethanes at levels above the standard (150ug/l) were detected in Killurney and Burncourt supplies due to chlorination of water with elevated humic acid content
- ❖ Arsenic was detected in one sample taken by the EPA from Ahenny scheme and Benzene was detected in one sample taken by the EPA from Glenary. These noncompliance's will be investigated further but are likely to be anomalies related to the nature of sampling point\technique. No historic evidence of problems exist.
- ❖ Nitrate levels in all public water supplies remain at low levels and are not a cause for concern in any supply.
- ❖ The EPA were granted a significant increase in enforcement powers under the new Regulations
- ❖ The EPA have indicated by their actions via Section 63 Notices and public statements that they want improved management and quality assurance at Drinking Water Treatment Plants. It is likely that they will insist on 'Best practice' with regard to Plant operation and not just be satisfied with achieving compliance.
- ❖ The EPA have either requested or recommended that continuous Chlorine and Turbidity monitoring, logging and 'call out alarm system' be put in place in Water Treatment Plants.
- ❖ The EPA has also indicated that they will be focusing their resources and enforcement powers on poorly performing treatment plants in the year ahead.

Recommendations

1. Put in place a HACCP team consisting of Scientist, Engineer, Process Technician and Plant operator to review in dept the critical operations and control points at each plant.
2. Funding should be provided to eliminate critical weaknesses identified during the above process in each plant. If necessary this funding should be sought from the Department.
3. Address the issue of unavailability of raw water storage (stabilization) and quality related alum dosing. Consider installation of system installed in Glenary for automatic adjustment of coagulant dose.
4. Install chlorine data recorders and alarm systems at each chlorination plant

Regulatory Framework

European Communities (Drinking Water Regulations) 2007 S.I. 278 of 2007

New Regulations were introduced in 2007. The European Communities (Drinking Water) (No 2) Regulations 2007 replace and update the European Communities (Drinking Water) Regulations 2000, which were in existence prior 2007. All public Water Supplies, Group Schemes > 50M³/Day and Private-Commercial Schemes >10M³/Day must comply with the above regulations. The Regulations are similar to the earlier Regulations but significantly increase the enforcement powers of the EPA and make provision for offences under the Regulations to be prosecuted on indictment. Maximum fines under the regulations will now be €500,000 following conviction on indictment, with related jail terms of up to 3 years. The penalty provisions for conviction following summary prosecution provide for fines up to €5,000 and/or a 3-month jail term. The monitoring requirements and the parametric standards have not changed in any substantial way from previous regulations. The limit for Fluoride has been reduced from 1.0 mg/l to 0.8 mg/l effective from 1st July 2007 in the case of fluoridated supplies. The limit for Trihalomethanes will reduce from a current MAC of 150ug/l to 100 ug/l on 25th December 2008. The major changes relate to penalties for offences and failure to follow the requirements of the Regulations

The Regulations prescribe 48 parametric values, which are classified as being ‘Microbiological’, ‘Chemical’ or ‘Indicator’ parameters. Furthermore, the Regulations outline two distinct monitoring categories, ‘Check Monitoring’ and ‘Audit Monitoring’, the latter being by far the more demanding in analytical terms. The number of each type of sample which must be taken on each supply is dependent on the volume produced and is specified in the Regulations. (Outlined in Table I below which is taken from the Statutory Instrument).

Table 1 –Taken from S.I. 278 of 2007 Minimum Sampling Frequency

<u>Volume of water distributed or produced each day within a supply zone</u> <u>(Notes 1 and 2)</u> <u>m³</u>	<u>Check monitoring – number of samples per year</u> <u>(Notes 3, 4 and 5)</u>	<u>Audit monitoring – number Of samples per year</u> <u>(Notes 3 and 5)</u>
≥10 ≤ 100	2	Note 6
> 100 ≤ 1000	4	1
> 1000 ≤10 000	4	1 + 1 for each 3 300 m ³ /d and part thereof of the total volume
> 10 000 ≤100 000		3 + 1 for each 10 000 m ³ /d and part thereof of the total volume
> 100 000		10 + 1 for each 25 000 m ³ /d and part thereof of the total volume
	+ 3 for each 1 000 m ³ /d and part thereof of the total volume	

Dealing with Non Compliant Samples

Article 10 of the Regulations outlines the specific actions that must be taken in the event of a failure to meet the *Microbiological*, *Chemical* or *Indicator* parametric values. In essence, the Water Services Authority is required to investigate every breach of the parametric values to determine its cause and to instigate corrective action depending on the type of failure reported (i.e., whether it is a microbiological, chemical or indicator parameter), whether there is a risk to public health and on the type of supply the failure is reported in (i.e., public water supply or a private water supply).

South Tipperary County Council has a procedure in place for dealing with samples, which fail to comply with the Drinking Water Regulations. Details of samples, which fail to comply with the Table A, Microbiological Parameters or Table B, Chemical Parameters, are notified immediately to both Water Services Engineering staff and HSE Public Health staff and to the EPA before 11 am on the following day. In addition where such situations arise, immediate resampling is undertaken to verify the actual position and details of such testing is also forwarded to the above personnel. Water Services then prepare a Corrective Action Report and in so doing investigate the operation of the relevant treatment plant and distribution system.

Check Monitoring

The purpose of check monitoring is to provide information on a regular basis on the organoleptic and microbiological quality of the water supplied for human consumption as well as information on the effectiveness of drinking-water treatment (particularly of disinfection), in order to determine whether or not water intended for human consumption complies with the relevant parametric values laid down in the Regulations. South Tipperary is obliged to take a minimum of 225 Check samples annually. The actual number taken in 2007 was 317.

Parameters are covered by check monitoring:

- Aluminium (Note 1)
- Ammonium
- Colour
- Conductivity
- Clostridium perfringens (including spores)(Note 2)
- Escherichia coli (E. coli)
- Hydrogen ion concentration
- Iron (Note 1)
- Nitrite (Note 3)
- Odour
- Taste
- Coliform bacteria
- Turbidity

Notes

Note 1:Necessary only when used as flocculant .

Note 2:Necessary only if the water originates from or is influenced by surface water

Note 3:Necessary only when chloramination is used as a disinfectant

Audit monitoring

The purpose of audit monitoring is to provide the information necessary to determine whether or not all the parametric values specified are being complied with. All such parameters must be subject to audit monitoring unless it can be established that a parameter is not likely to be present in a given supply in concentrations which could lead to the risk of a breach of the relevant parametric value. South Tipperary is obliged to take a minimum of 225 Check samples annually. The actual number taken in 2007 was 317.

Table 2 Details of Public Water Supplies in South Tipperary

Scheme Name/Water Supply	Public/Private /Group	Scheme Code (####)	Gr/Su/Sp/Mix	Volume M3 per Day	Estimated Population Served
Ahenny	PWS	29000101	Groundwater	50	100
Ardfinnan Regional	PWS	29000102	Surface Water	7010	8250
Ballincurry	PWS	29000103	Groundwater	371	500
Ballinvir	PWS	29000104	Groundwater	90	100
Burncourt Regional	PWS	29000105	Surface Water	2844	2038
Cahir Reservoir	PWS	29000106	Surface Water	426	500
Carrick-on-Suir [Crottys Lake]	PWS	29000118	Surface Water	1080	2500
Carrick-on-Suir [Lingaun River]	PWS	29000150	Surface Water	1080	3000
Clonmel Poulavanogue	PWS	29000109	Surface Water	2000	5000
Cloran Regional	PWS	29000110	Surface Water	1495	2500
Coalbrook	PWS	29000111	Groundwater	918	1045
Commons.	PWS	29000112	Spring Water	82	300
Dundrum Regional	PWS	29000113	Surface Water	3785	4783
Galtee Regional	PWS	29000130	Surface Water	8574	11600
Clonmel GLENARY	PWS	29000134	Surface Water	10000	12000
GLENGAR	PWS	29000202	Spring Water	419	931
Gortnapisha Regional	PWS	29000137	Surface Water	1272	2500
GRAIGUE	PWS	29000205	Surface Water	1392	1192
HOLLYFORD	PWS	29000143	Spring Water	176	150
IRONMILLS	PWS	29000146	Groundwater	1558	2312
KILCASH	PWS	29000147	Spring Water	55	90
KILLURNEY	PWS	29000210	Surface Water	1720	1488
Springmount	PWS	29000227	Spring Water	1257	500
Tipperary UDC	PWS	29000123	Mixture	3023	5209
Tullohea	PWS	29000124	Spring Water	181	200
Mullenbawn	PWS	29000149	Spring Water	3687	2500
Monroe Well	PWS		Groundwater	918	1045

Analysis of Water Supply Compliance Data

The following tables provide an overall compliance summary for the Public Supplies for each group of parameters in South Tipperary during 2007 and enable a comparison with the data for 2005 and 2006. More detailed information on each particular parameter is provided in Tables No 4,5,6, 7,8,9.

Table No 3: Summary Compliance of Public Supplies with Microbiological, Chemical and Indicator Parametric Values set in S.I. 278 of 2007

	No. of Samples 2007	No. of Exceedances 2007	% Compliance 2007	% Compliance 2006	% Compliance 2005
Microbiological (Table A)	463	2	99.57	100.0	99.4%
Chemical (Table B)	1650	6	99.64	99.9	99.2%
Indicator Compliance	3969	111	97.20	96.83	96.1%
Overall Compliance Public Water Supplies 2007	6082	119	98.84%	97.89%	97.2%

Table No 4 Compliance of 26 Public Water Supplies with Parametric Values set in S.I. 439 of 2000

South Tipperary Drinking Water 2006 Public Supplies	No. of Samples	No. of Exceedances	% Compliance 2007	% Compliance 2006	% Compliance 2005
E. coli	390	1	99.7	100.0	99.5%
Enterococci	73	1	98.6	100.0	98.6%
Chemical Parameters					
Antimony	72	0	100.0	100.0	95.8%
Arsenic	72	1	98.6	100.0	100.0%
Benzene	74	1	98.6	100.0	100.0%
Benzo(a)pyrene	63	0	100.0	100.0	100.0%
Boron	72	0	100.0	100.0	100.0%
Bromate	25	0	100.0	100.0	100.0%
Cadmium	72	0	100.0	100.0	100.0%
Chromium	72	0	100.0	100.0	100.0%
Copper	72	0	100.0	100.0	100.0%
Cyanide	25	0	100.0	100.0	100.0%
1,2-dichloroethane	74	0	100.0	100.0	100.0%
Epichlorohydrin	NT	NT			
Fluoride	297	0	100.0	100.0	97.3%
Lead	72	0	100.0	100.0	100.0%
Mercury	63	0	100.0	100.0	100.0%
Nickel	72	0	100.0	100.0	100.0%
Nitrate	62	0	100.0	100.0	100.0%
Nitrite (at tap)	62	0	100.0	100.0	100.0%
Pesticides - Total	25	0	100.0	100.0	100.0%
PAH	25	0	100.0	100.0	100.0%
Selenium	72	0	100.0	100.0	100.0%
Tetrachloroethene & Trichloroethene	74	0	100.0	100.0	100.0%
Trihalomethanes(Total)	83	4	95.2	98.5	98.2%
Vinyl Chloride	50	0	100.0	100.0	100.0%
Indicator Parameters					
Aluminium	175	29	83.4	80.7	73.3%
Ammonium	373	0	100.0	99.7	98.1%
Chloride	62	0	100.0	100.0	100.0%
Clostridium Perfringens	386	4	99.0	99.2	98.7%
Colour	385	20	94.8	95.6	96.2%
Conductivity	385	0	100.0	100.0	100.0%
PH	385	0	100.0	97.2	93.4%
Iron	72	3	95.8	86.1	84.0%
Manganese	72	2	97.2	93.5	94.9%
Odour	390	0	100.0	98.5	100.0%
Sulphate	73	0	100.0	100.0	100.0%
Sodium	72	0	100.0	100.0	100.0%
Taste	343	0	100.0	98.5	100.0%
Colony Count @ 22°C	46	2	95.7	89.5	82.5%
Coliform Bacteria	390	19	95.1	93.9	94.3%
Turbidity (at tap)	360	32	91.1	99.2	98.7%

Table 3 and Table 4 provide an overview of the water quality data for 2007 and how it compares with previous years. In total 317 'Check' and 73 'Audit' samples were tested during the year. In addition a survey for Trihalomethanes (THM's) was undertaken due to exceedences for that parameter in 2006. In total 6082 tests were carried out and the total number failing to comply was 119 giving an overall compliance rate of 98.84 % an improvement over the 97.2% for previous year.

Check Monitoring Samples	= 317
Audit Monitoring Samples	= 73
Investigations (Survey THM)	= 20

Check Monitoring is carried out at the Councils Environmental Laboratory. 50 Audit samples were tested by the Kilkenny EPA Inspectorate on behalf of South Tipperary and an additional 23 Audit samples were tested by Environmental Laboratory Services Cork (ELS) an accredited private laboratory. Unfortunately the Kilkenny laboratory was unable to test for certain audit parameters such as PAH and Pesticides and Benzopyrene and therefore the Audit results from that laboratory are incomplete. However I am satisfied that based on existing monitoring and historical data that these particular parameters are not a risk factor in South Tipperary and that the monitoring of Public Supplies met the requirements of the Regulations in 2007.

Microbiological Quality

The most important indicators of drinking water quality are the microbiological parameters and, in particular, Escherichia Coli (E. Coli) and Enterococci bacteria given that their presence in drinking water is a clear indication that either the source of the water has become contaminated or that the disinfection process at the water treatment plant is not operating properly

Within the above context, the quality of the Public Supplies in South Tipperary was good with just two failures recorded for these crucial parameters. This performance however was slightly inferior to that of 2006 when no failures were recorded. The failures were due to breakdown in the chlorination process and were quickly resolved. The results for Clostridia perfringens (99.0% compliance) were similar to previous year (99.2% in 2006). Compliance for the indicator parameter Coliform Bacteria increased with 19 recorded sample failures giving an 95.1% compliance rate compared with 93.9% for the previous year. Such bacteria are indicative of either deposits within the distribution mains, inadequate disinfection residuals or in certain circumstances dirty taps at sampling points. It is important to reiterate that such bacteria while being unwelcome within a supply zone do not have the same degree of significance as E. Coli or Enterococci. Frequent flushing of the distribution mains and reservoirs is important to ensure good compliance for this parameter.

Cryptosporidium

Cryptosporidium were detected in the Glenary Supply following heavy rainfall in June, which resulted in a Boil Water Notice being issued on the advice of the HSE, and required a significant upgrading of the plant before the Notice was lifted. The level of Cryptosporidium correlated closely with exceptionally heavy rainfall recorded during that period following a particularly dry spring. The treatment plant was not effectively removing them before the upgrade. Cryptosporidium monitoring (survey) in twelve surface water schemes in April all returned satisfactory results.

Chemical Testing - Chemical Parameters

Three samples taken from Killurney and one from Burncourt scheme contained levels of Trihalomethane (a suspected carcinogen) in excess of 150ug/l, which is the current standard. Trihalomethanes generally arise as a byproduct of the chlorination of water which has elevated humic acids (colour). The 2007 results for Killurney are a repeat of failures recorded in 2005 and 2006 for Trihalomethanes. The commissioning of the new groundwater source at Templetney should eliminate the problem and should be expedited.

One off exceedences were recorded for Benzene in the Glenary Supply and Arsenic in the Ahenny supply. Both samples were taken by the EPA. There is no history of problems with either parameter and it is possible the result is an anomaly related to the 'outdoor' sampling point. However follow-up sampling will be under taken across both supplies as part of further investigation into each parameter.

Compliance with the acrylamide, epichlorohydrin and vinyl chloride parametric values is determined by product specification and not by laboratory analysis. South Tipperary County Council are satisfied that all water treatment products used are included in the latest "*List of Approved Products and Process*" published by the Drinking Water Inspectorate for England and Wales and that the products are being used in accordance with the conditions of approval by the above Inspectorate.

Aluminium Compliance

The most frequent indicator parameter failing in 2007 was Aluminium as has been the case for a number of years. While compliance with the parametric standard 200ug/l has improved in recent years from 67% (2004), 73.3% (2005), 80.7% (2006) to 83.4% in 2007 the situation with regard to compliance remains unsatisfactory and the EPA has expressed concern about the ongoing rate of noncompliance in the Galtee Regional, Ardfinnan Regional, Dundrum Regional schemes in particular. This reflects fundamental issues with the treatment plants where alum is used as a coagulant. The soft nature of the source water, the absence of raw water storage and the inability of the plants to adjust coagulant dose in response to heavy rainfall makes achievement of compliance during variable weather particularly difficult. There is a particular difficulty in treating surface water abstracted directly from upland rivers compared to abstractions taken from large natural or mad made reservoirs. This difficulty must be recognized and overcome either by automatic alum adjustment or increased operator presence at the plant. The performance of Dundrum Regional Water Treatment Plant was particularly poor in 2007. The critical factors here being the retirement of an experienced caretaker who lived relatively close to the plant, difficult weather conditions, lack of polyelectrolyte dosing and in particular problems with alum desludging of clarification tanks. The situation gave rise to a large number of public complaints and the data for Dundrum is likely to be of particular concern to the EPA.

It is recommended that the following factors be investigated and addressed in order to secure improved compliance with the aluminum standard in Galtee, Ardfinnan and Dundrum Regional Plants.

1. Suitability and capacity of the treatment plants to deal with the nature and variability of the raw water source in particular low buffering capacity and extremes of colour, which can vary from zero to over 100 Hazen within 3 hours.
2. Lack of storage reservoirs prior to treatment to buffer the variability and allow more consistent dosing
3. Build up of deposits in mains and service reservoirs and lack of resources or water to flush mains adequately.

Fig 1

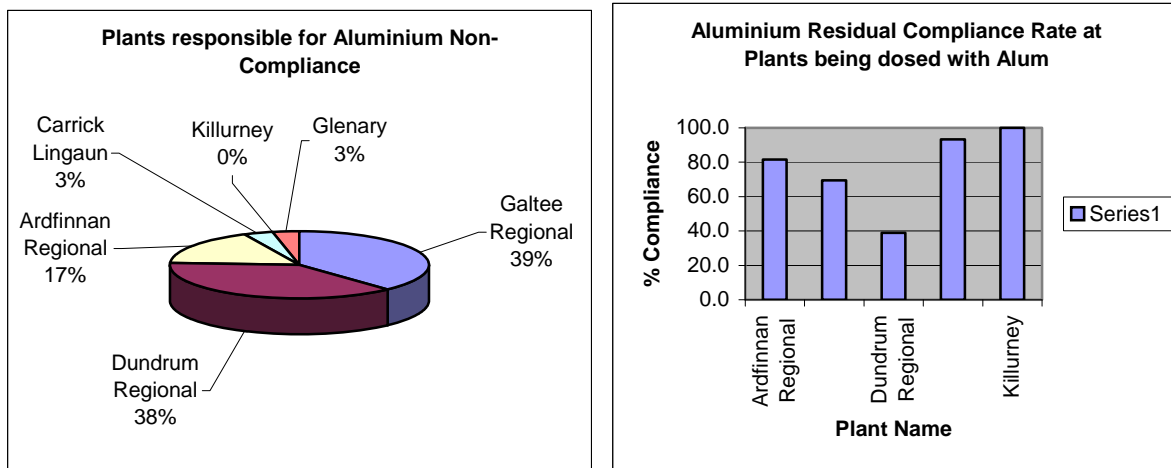


Table 5 Details of Non Compliant Aluminium Tests (Standard 200ug/l)

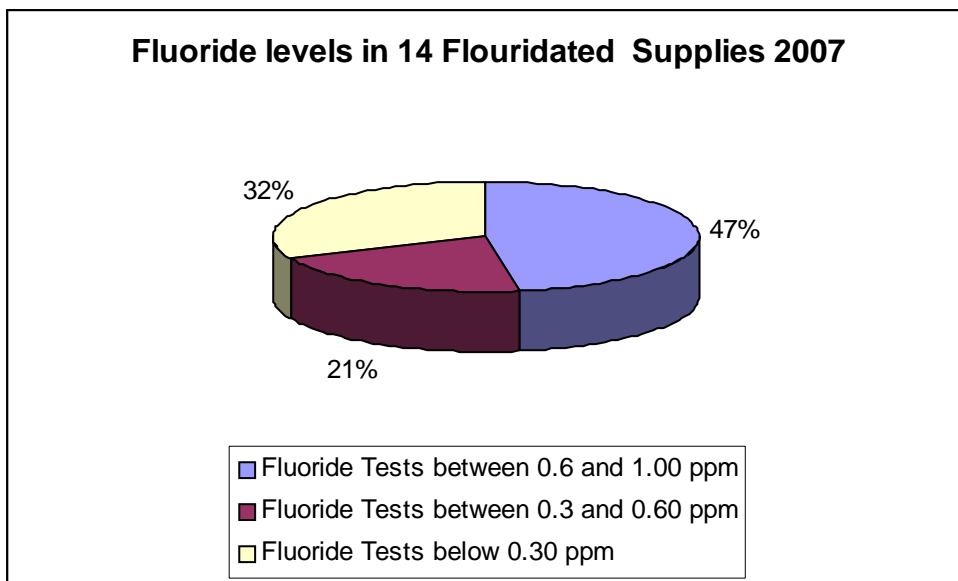
Scheme Name/Water Supply	Date (dd/mm/yy)	Aluminium ug/l
Ardfinnan Regional	07/03/2007	566.4
Ardfinnan Regional	14/08/2007	633
Ardfinnan Regional	23/08/2007	403.8
Ardfinnan Regional	31/10/2007	567
Ardfinnan Regional	12/12/2007	553
Carrick - [Lingaun]	15/01/2007	240.1
Dundrum Regional	21/05/2007	416.3
Dundrum Regional	05/06/2007	208
Dundrum Regional	11/07/2007	720
Dundrum Regional	15/01/2007	289.2
Dundrum Regional	07/03/2007	276.9
Dundrum Regional	12/03/2007	255.7
Dundrum Regional	14/08/2007	832.8
Dundrum Regional	16/08/2007	1516.8
Dundrum Regional	19/09/2007	411.4
Dundrum Regional	11/10/2007	217.8
Dundrum Regional	12/04/2007	223.1
Galtee Regional	14-Aug-07	356
Galtee Regional	01/02/2007	252
Galtee Regional	15/05/2007	220.9
Galtee Regional	23/08/2007	340.4
Galtee Regional	31/10/2007	291
Galtee Regional	28/11/2007	1221
Galtee Regional	19/12/2007	525
Galtee Regional	05/06/2007	562.8
Galtee Regional	25/07/2007	257.5
Galtee Regional	14/08/2007	327.6
Galtee Regional	31/10/2007	276.8
GLENARY	28/11/2007	822
Mean Exceedence		475

Low pH was a particular problem in the Kilcash supply and to a lesser extent the Killurney supply during the year and increased alkali addition is required in both supplies to render them less aggressive. Manganese and Iron were elevated in the Commons supply and were responsible for high turbidity levels in the water. Colour were other parameters where non-compliances contributed significantly during 2007. pH is important in that it increases the risk of plumb solvency . Colour due to humic acids is important as it plays a significant role in the formation of Trihalomethanes and can also contribute to Coliform Bacteria re-growth in distribution mains. Iron and Manganese impair the beneficial use of the water and affects its aesthetic appearance giving rise to staining and highly turbid water.

Performance of Fluoridation Plants

Fluoride level in all samples was under the maximum admissible level permitted which was reduced from 1.0 to 0.8 ppm in July 2007. However there was a notable increase in the number of 'Fluoridated' supplies having just trace levels of Fluoride indicating plant shut down. This is an issue likely to be of particular concern to the HSE who fund its application to 14 drinking water plants in the County.

Fig 2



Future EPA Audits

It is likely that more frequent audits of Drinking Water Treatment Plants will be carried out in the future and that these will focus more on actual process design and operation than previous audits. Critical issues likely to be raised by the EPA in future audits include:

1. Chlorine monitoring, logging and alarm systems in place at plants
2. Turbidity recorders for raw and filtered water
3. Aluminum residual levels in the context of treatment plant performance and efficiency of filtration
4. Process operation control and record keeping at treatment plants

Some key aspects of plant operation, which should be investigated, include:

- ❖ Is the screen taking out particulates likely to clog on line instruments \ pumps etc?
- ❖ Does the intake screen suffer from blockages and how does this affect abstraction rate?
- ❖ If abstraction rate is reduced are the chemical dosing pumps responding i.e. flow proportional?
- ❖ What is Total Filtration Area and the Operating Filtration Rate?
- ❖ What are settlement tanks surface area & upward velocity in meters/hour?
- ❖ What is depth of media and what is bed composed of.?
- ❖ When was sand last changed?
- ❖ Is there evidence of filter cracking- mudballing?
- ❖ Is sand being lost in back wash process and how much?
- ❖ What is backwashing procedure?
- ❖ Chlorine contact time & Alarm systems?
- ❖ On line turbidity meters & Alarms & Automatic Shut down?
- ❖ How is raw water & dosing stabilised.?
- ❖ What are the effects of temperature, pH, Turbidity & Colour on coagulation?
- ❖ What is air flow rate in backwash ?
- ❖ What is water flow rate in back wash?
- ❖ What are the criteria for filter back washing?

Protection of Drinking Water Sources

South Tipperary County Council is fortunate that a large number of our sources are inherently low risk upland catchments not under intense development pressure or subject to intensive land use. However a number of supplies are located in catchments which are subject to increasing pressure from one off houses, agricultural activities, increased road transport, permitted and licensed activities and land spreading of organic waste. Each of the catchments for the river abstractions has been delineated and it is recommended that South Tipperary Council should proceed with the development of a 'Source Protection Plan' for these catchments and eventually for all groundwater sources once their vulnerability zones are mapped.

<i>Water Supply</i>	<i>Source</i>	<i>Volume M3 per Day</i>	<i>Issues</i>
Ahenny	Groundwater	50	Chlorine Logging & Alarm? Arsenic exceedence in audit sample requires investigation but likely to be related to defective sampling point
Ardfinnan Regional	Surface Water	7010	Frequency of aluminium exceedence, Lack of storage – difficult to treat
Ballincurry	Groundwater	371	Mixed with Coalbrook, Chlorine Logging & Alarm?
Ballinvir	Groundwater	90	Chlorine Logging & Alarm?
Burncourt Regional	Surface Water	2844	Risk of THM and Coliform failure due to severe discoloration during wet weather Chlorine Logging & Alarm?
Cahir Reservoir	Surface Water	426	Chlorine Logging & Alarm?
Carrick-on-Suir [Crottys Lake]	Surface Water	1080	Chlorine Logging & Alarm?
Carrick-on-Suir [Lingaun River]	Surface Water	1080	Chlorine Logging & Alarm? High Risk Catchment - N76 Route + farming– Source Protection
Clonmel Poulavanogue	Surface Water	2000	Risk of THM and Coliform failure due to severe discoloration during wet weather
Cloran Regional	Surface Water	1495	Chlorine Logging & Alarm?
Coalbrook	Groundwater	918	Chlorine Logging & Alarm?

Water Supply	Source	Volume M3 per Day	Issues
Commons.	Spring Water	82	Chlorine Logging & Alarm? Iron and Manganese?
Dundrum Regional	Surface Water	3785	Very Poor plant performance in 2007 Aluminium, Turbidity Monitors, Storage, Sludge bleeds and high risk catchment (farms)
Galtee Regional	Surface Water	8574	Frequency of aluminium exceedence, Lack of storage – difficult to treat
Clonmel GLENARY	Surface Water	10000	Upgraded plant commissioned at end of year. Benzene exceedence requires follow-up. Cryptosporidium monitoring
GLENGAR	Spring Water	419	Chlorine Logging & Alarm?
Gortnapisha Regional	Surface Water	1272	Risk of THM and Coliform failure due to severe discoloration during wet weather Chlorine Logging & Alarm?
GRAIGUE	Surface Water	1392	Chlorine Logging & Alarm?
HOLLYFORD	Spring Water	176	Chlorine Logging & Alarm? Spring Source Vulnerable?
IRONMILLS	Groundwater	1558	Chlorine Logging & Alarm? Hard Water complaints

<i>Water Supply</i>	<i>Source</i>	<i>Volume M3 per Day</i>	<i>Issues</i>
KILCASH	Spring Water	55	Chlorine Logging & Alarm? Aggressive water due to low pH
KILLURNEY	Surface Water	1720	Problems with THM likely due to discoloured water. New Source at Templenety will be hard water.
Springmount	Spring Water	1257	Chlorine Logging & Alarm? Hard Water complaints Mixed with Galtee Regional
Tipperary UDC	Mixture	3023	Chlorine Logging & Alarm?
Tullohea	Spring Water	181	Chlorine Logging & Alarm?
Mu;;embawn	Spring Water	3687	Chlorine Logging & Alarm? – Hard Water Complaints
Monroe Well	Groundwater	918	Chlorine Logging & Alarm? – Hard Water Complaints

Table 6 Details of Non - Compliant Coliform Bacteria Tests (Standard 0 /100ml)

Scheme Name/Water Supply	Date (dd/mm/yy)	Coliform Bacteria No/100ml
Burncourt Regional	01/03/2007	1
Cloran Regional	01/02/2007	2
Dundrum Regional	21/05/2007	14
Dundrum Regional	14/08/2007	37
Dundrum Regional	16/08/2007	34
Galtee Regional	12/04/2007	12
GLENARY	05/02/2007	1
Gortnapisha Regional	05/06/2007	2
Gortnapisha Regional	11/07/2007	2
HOLLYFORD	21/05/2007	1
Killurney	05-Jun-07	1
KILLURNEY	11/06/2007	16
Monroe	19/12/2007	1
Mullenbaun	19/09/2007	2
Springmount	21/05/2007	2
Tipperary UDC	05/02/2007	1
Tullohea	21/05/2007	1
Tullohea	11/07/2007	3
Mean Exceedance		7

Table 7 Details of Non Compliant pH Tests (Standard 6.5 <pH <9.5)

Scheme Name/Water Supply	Date (dd/mm/yy)	PH Reading
Ahenney	28/08/2007	6.47
Carrick-on-Suir [Crottys Lake]	25/10/2007	5.98
GLENARY	11/10/2007	6.43
GLENARY	07/03/2007	6.27
Kilcash	12-Mar-07	5.5
Kilcash	05-Jun-07	5.6
KILCASH	28/05/2007	5.59
KILCASH	01/02/2007	5.64
KILCASH	28/11/2007	5.64
KILCASH	12/12/2007	5.57
KILLURNEY	25/10/2007	6.26
KILLURNEY	08/01/2007	6.19
KILLURNEY	01/03/2007	6.2
POULAVANOGUE	11/10/2007	6.33

Table 8 Details of Turbidit Values over 1.0 NTU

Name of Water Supply	Date (dd/mm/yy)	Turbidity NTU
Ardfinnan Regional	07/03/2007	1.7
Ardfinnan Regional	14/08/2007	1.4
Ardfinnan Regional	23/08/2007	1.2
Ardfinnan Regional	31/10/2007	2.1
Cahir Reservoir	15/01/2007	6.2
Coalbrook	12/04/2007	1.3
Coalbrook	28/05/2007	1.3
Coalbrook	28/08/2007	1.2
Commons	05-Jun-07	5.1
Commons	12-Mar-07	2.7
Commons.	01/02/2007	1.1
Commons.	12/04/2007	6.8
Commons.	28/05/2007	1.7
Commons.	28/08/2007	3.0
Commons.	05/06/2007	3.7
Commons.	19/09/2007	4.1
Dundrum Regional	14-Aug-07	2.8
Dundrum Regional	14-Aug-07	1.7
Dundrum Regional	11/07/2007	3.8
Dundrum Regional	14/08/2007	1.9
Dundrum Regional	16/08/2007	5.3
Galtee Regional	28/11/2007	2.3
GLENARY	19/06/2007	1.9
GLENARY	28/11/2007	1.9
Gortnapisha Regional	12/12/2007	1.1
Graigue	12-Mar-07	4.0
Kilcash	05-Jun-07	4.3
Mullinbawn	12-Mar-07	1.5
POULAVANOGUE	19/06/2007	2.1
POULAVANOGUE	31/10/2007	1.5
POULAVANOGUE	06/12/2007	11.3

Table 9 Details of Colour Measurements >20 Hazen

Name of Water Supply	Date (dd/mm/yy)	Colour (Hazen)
Killurney	05-Jun-07	30
Springmount	21/05/2007	39
Tipperary UDC	21/05/2007	39
Ardfinnan Regional	05/06/2007	25
Commons.	28/08/2007	55
Commons.	19/09/2007	30
Dundrum Regional	11/07/2007	25
Dundrum Regional	14/08/2007	30
Dundrum Regional	16/08/2007	65
GLENARY	19/06/2007	110
GLENARY	25/07/2007	35
GLENARY	14/08/2007	25
Gortnapisha Regional	05/06/2007	25
Gortnapisha Regional	11/07/2007	25
KILLURNEY	11/07/2007	70
KILLURNEY	08/01/2007	30
KILLURNEY	07/03/2007	35
POULAVANOGUE	19/06/2007	110
POULAVANOGUE	25/07/2007	55
POULAVANOGUE	14/08/2007	30

Table 10 Details of Trihalomethane levels found during investigative survey into THM levels.

Name of Water Supply	Date	Total Trihalomethanes ug/l
Ardfinnan Regional	10-Sep-07	59.6
Burncourt	10-Sep-07	12.4
Burncourt	05-Jul-07	185
Cloran	10-Sep-07	1.9
Dundrum Regional	10-Sep-07	32.5
Galtee Regional	10-Sep-07	25.9
Glenary	15-Aug-07	59.4
Gortnapisha	10-Sep-07	17.5
Gortnapisha	07-Mar-07	9.3
Gortnapisha	07-Mar-07	65
Gortnapisha	07-Mar-07	60.8
Killurney	20-Apr-07	25.4
Killurney	20-Apr-07	26.1
Killurney	20-Apr-07	29.2
Killurney	07-Mar-07	227
Killurney	07-Mar-07	259.4
Killurney	07-Mar-07	49
Killurney	07-Mar-07	219.2
Kilurney	10-Sep-07	25.7
Mullinbawn	10-Sep-07	2.9