



Water Services Westmeath County Council

European Communities (Drinking Water) (No. 2) Regulations 2007

Drinking Water Monitoring Program 2009 Sampling Manual



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1.0 Sampling Strategy

1.1 References

- 1.1.1 The European Communities (Drinking Water)(No.2) Regulations, 2007 (S.I. 278 of 2007).
- 1.1.2 Drinking Water Regulations Guidance Booklet No.1 issued in November 2007 by the office of Environmental Protection (EPA).
- 1.1.3 The European Communities (Quality of Surface Water Intended for the Abstraction of Drinking Water) Regulations, 1989 (S.I. 294 of 1989).
- 1.1.4 Handbook on Implementation [of S.I. 294 of 1989] for Sanitary Authorities published by the Environmental Research Unit of the Department of the Environment in 1990.

2.0 Supplies to be Monitored

2.1 The basic units for monitoring under the 2007 Regulations are water supply zones. The watermain network in Westmeath is divided into separate water supply zones for the purposes of the regulations. The water main network is divided into areas served by specific reservoirs, re-chlorination stations and group water supply schemes $>10 \text{ m}^3 / \text{day}$. The maps attached to this manual define the physical boundary of each water supply zone.

2.2 Public Water Supply Schemes and Publicly Sourced Group Water Supply Schemes supplying $\geq 10 \text{ m}^3 / \text{day}$

The council operates eight water supply schemes in the county. These schemes serve all of the major towns and villages in the county as well as an extensive rural watermain network. The group water scheme sector has over the years greatly extended the rural watermain network by extensions to the existing public networks. Many of these schemes were subsequently taken in charge by the council while others remain under the operation of the individual group.

The European Communities (Drinking Water) Regulations 2007 require the council to monitor the drinking water in all group water supply schemes supplying greater than $10 \text{ m}^3 / \text{day}$, regardless of whether these schemes are publicly or privately sourced. A total of 27 publicly sourced water supply schemes are to be tested in 2009.

Three schemes are sourced from Lough Owel and form part of the Mullingar Regional Water Scheme. These schemes are the Mullingar High Level WSS, the Mullingar Low Level WSS and the Mullingar Town Independent WSS. In total these schemes supply water to approximately 36,198 people. There are 8 publicly sourced group water supply schemes associated with the Mullingar High Level WSS, 6 publicly sourced group water supply schemes associated with the Mullingar Low Level WSS and 3 publicly sourced group water supply schemes associated with the Mullingar Town Independent WSS.

The next largest scheme is the Athlone Water Supply Scheme sourced from the Shannon River. This scheme serves approximately 20,705 people including 5 publicly sourced group water supply schemes.

The Castlepollard Regional Water Supply Scheme is divided into two schemes, the Castlepollard High Level WSS and the Castlepollard Low Level WSS. A total of 7,420 people are supplied water by these schemes. The majority of the High Level Scheme consists of 3 publicly sourced group water supply schemes. 2 publicly sourced group water supply schemes remain on the Low Level Scheme also. Most of the rural network on the Low Level Scheme was formally the North Westmeath Group Water Supply Scheme.

The council also operates small public water supply schemes at Moate and Ballinahown.

Table 1.1 outlines the names of the schemes, their water supply zone (WSZ) no., the population they supply, the demand on the scheme as well as the check and audit monitoring requirements.

WSZ No.	Name of Scheme	Population served	Water Consumed m ³ / day	Water Treatment Plant	Map No.
Mullingar High Level Water Supply Scheme					
MHL 1	Frewin Hill High Level Reservoir	6,275	1,255	Portloman WTP	1
MHL 1b	Dysart Lilliput GWSS	135	27	Portloman WTP	2
MHL 2	Dysart Re-Chlorination Station	865	173	Portloman WTP	3
MHL 2a	Redmondstown / Conranstown GWSS	75	15	Portloman WTP	4
MHL 2b	Ballyhast GWSS	75	15	Portloman WTP	5
MHL 2c	Derryroe / Killard GWSS	120	24	Portloman WTP	6
MHL 2d	Toarlisnamore GWSS	90	18	Portloman WTP	7
MHL 2e	Raheenmore GWSS	60	12	Portloman WTP	8
MHL 2f	Shureen / Ballymacmorris GWSS	100	20	Portloman WTP	9
MHL 3	Gaybrook Water Tower	3,455	691	Portloman WTP	10
MHL 3a	Simonstown GWSS	115	23	Portloman WTP	11
MHL 3d	Raheenquill GWSS	60	12	Portloman WTP	12
MHL 4	Kilbeggan Reservoir	1,000	200	Portloman WTP	13

Note: MHL 1a, MHL 2g and MHL 3c have been taken in charge by WCC during 2008 and are removed from the 2009 programme.

WSZ No.	Name of Scheme	Population served	Water Consumed m ³ / day	Water Treatment Plant	Map No.
Mullingar Low Level Water Supply Scheme					
MLL 1	Frewin Hill Low Level Reservoir	5,485	1,097	Portloman WTP	14a 14b 14c
MLL 1a	Lisryan / Lismacaffrey GWSS	225	45	Portloman WTP	15
MLL 1c	Kilbixy GWSS	65	13	Portloman WTP	16
MLL 1d	Kilpatrick / Bunbrosna GWSS	90	14	Portloman WTP	17
MLL 1e	Ballynacarrigy / Emper GWSS	98	20	Portloman WTP	18
MLL 1f	Moyvore GWSS	50	10	Portloman WTP	19
MLL 1g	Ballygarveybeg / Killnaugh GWSS	30	10	Portloman WTP	20
MLL 2	Mullaghmeehan Re-Chlorination station	490	98	Portloman WTP	21
Mullingar Town Independent Water Supply Scheme					
MTI 1	Ardonagh Reservoir	12,940	2,588	Portloman WTP	22
MTI 1e	Clongowney GWSS	150	30	Portloman WTP	23
MTI 2	Killucan Reservoir	3,650	730	Portloman WTP	24
MTI 2d	Monganstown / Clonfad / Rathbawn GWSS	120	24	Portloman WTP	25
MTI 2e	Hodgestown GWSS	380	76	Portloman WTP	26

Note: MLL 1b, MTI 1a, MTI 1b, MTI 2b, MTI 2c and MTI 1f have been taken in charge by WCC during 2008 and are removed from the 2009 programme.

WSZ No.	Name of Scheme	Population served	Water Consumed m³/ day	Water Treatment Plant	Map No.
Athlone Water Supply Scheme					
ATH 1	Athlone Water Supply Scheme	19,990	3,998	Athlone WTP	27
ATH 1a	Clonbonny GWSS	375	75	Athlone WTP	28
ATH 1b	Moydrum / Baylin GWSS	80	16	Athlone WTP	29
ATH 1e	Coolvuck GWSS	130	26	Athlone WTP	30
ATH 1g	Garrynafela GWSS	100	20	Athlone WTP	31
ATH 1h	Carrick O'Brien GWSS	50	11	Athlone WTP	32
Castlepollard High Level Water Supply Scheme					
CHL 1	Castlepollard High Level Water Supply Scheme	1,200	240	Ballany WTP	33
CHL 1b	Clonageeragh / Sallymount GWSS	55	11	Ballany WTP	34
CHL 1d	Ankerland Fore GWSS	150	30	Ballany WTP	35
CHL 1e	Cummerstown GWSS	165	33	Ballany WTP	36
WSZ No.	Name of Scheme	Population served	Water Consumed m³/ day	Water Treatment Plant	Map No.
Castlepollard Low Level Water Supply Scheme					
CLL 1	Castlepollard Low Level Reservoir	4,280	856	Ballany WTP	37a 37b
CLL 1c	Gartlandstown GWSS	320	64	Ballany WTP	38
CLL 2	Delvin Re-Chlorination Station	1,250	250	Ballany WTP	39

Note: ATH 1d, ATH 1f, CHL 1a, CHL 1c, CLL 1d and MTI 2f have been taken in charge by WCC during 2008 and are removed from the 2009 programme.

WSZ No.	Name of Scheme	Population served	Water Consumed m ³ / day	Water Treatment Plant	Map No.
Moate Water Supply Scheme					
MOA 1	Ardnapondra Reservoir	2,135	437	Ballinderry WTP	40
Ballinahown Water Supply Scheme					
BHN 1	Ballinahown Water Supply Scheme	100	20	Ballinahown WTP	41

Table 1

2.3 Privately Sourced Group Water Supply Schemes Supplying ≥ 10 m³ / day

There are three schemes that fit into this category and therefore are subject to testing for the same parameters and at the same intervals as the public schemes. These schemes are the Multyfarnham Group Water Supply Scheme, the Mount Temple Group Water Supply Schemes, the Lavagh / Ballyheelan Group Water Supply Scheme and the Ballybroder Group Water Supply Scheme.

Table 2 outlines the frequency of sampling for these four schemes:

WSZ No.	Name of Scheme	Population served	Water Consumed m ³ / day	Water Treatment Plant	Map No.
Multyfarnham Group Water Supply Scheme					
MUL 1	Multyfarnham Group Water Supply Scheme	800	160	Multyfarnham GWSS WTP	42
Mount Temple Group Water Supply Scheme					
MTP 1	Mount Temple Group Water Supply Scheme	100	20	Mount Temple GWSS WTP	43
Lavagh / Ballyheelan Group Water Supply Scheme					
FIN 1	Lavagh / Ballyheehan Group Water Supply Scheme	150	30	Lavagh Ballyheelan GWSS WTP	44
Ballybroder Group Water Supply Scheme					
BBR 1	Ballybroder Group Water Supply Scheme	50	10	Ballybroder GWSS WTP	45

Table 2

2.4 Privately Sourced Water Supplies supplying $\leq 10 \text{ m}^3 / \text{ day}$ but supplying a Public or a Commercial Activity

The regulations also require the council to carry out monitoring on small private supplies supplying a public or a commercial activity. The council therefore will monitor all schools, public houses, hotels, bed and breakfasts, sports clubs, restaurants and food production premises whose water is supplied from a private source. The Environmental Protection Agency's manual on the implementation of the European Communities (Drinking Water) Regulations 2000 require monitoring be carried out twice per year. The tests do not have to be for the full suite of parameters but only those parameters considered by the council after carrying out a risk assessment.

The council have thus far identified 40 such premises in the county, the majority in the Athlone / Kilbeggan Electoral Areas where the rural watermain network is poor. Table 3 indicates these locations.

No.	Premises	Location	Map
SPS 1	Fitzgerald's Public House	Boggagh Eighter, Castledaly, Moate	46
SPS 2	Castledaly Primary School	Kilcleagh, Castledaly, Moate	46
SPS 3	Glasson Golf & Country Club	Killinure North, Glasson	47
SPS 4	Kilcleagh Manor Hotel	Kilcleagh, Castledaly, Moate	46
SPS 5	Tubberclair Primary School	Toberclair, Glasson	47
SPS 6	Portlick Castle	Portlick, Glasson	47
SPS 7	Milltown Primary School	Milltown, Rathconrath, Mullingar	48
SPS 8	Sonna Primary School	Cartron, Ballynacarrigy	48
SPS 9	Castletown – Finea Primary School	Castletown Lower, Finea	49
SPS 10	Murray's Public House	Cartroncroy, The Pidgeons, Athlone	47
SPS 11	Tang Primary School	Clogher, The Pidgeons, Athlone	47
SPS 12	Drumraney Primary School	Cartroncoragh, Drumraney, Athlone	50
SPS 13	Ardnagrath Primary School	Ardnagrath, Walderstown, Athlone	47
SPS 14	Mount Temple Golf Club	Mount Temple, Moate	50
SPS 15	Rosemount Primary School	Ballybrickkoge, Rosemount, Moate	51
SPS 16	Three Jolly Pidgeons Public House	Bawn, The Pidgeons, Athlone	47
SPS 17	The Stile Public House	Ballybrickkoge, Rosemount, Moate	51
SPS 18	Streamstown Primary School	Cloghanaskaw, Streamstown, Mullingar	51
SPS 19	The Beach Tree Public House	Streamstown, Mullingar	51
SPS 20	The Hazel Public House	Capparush, Rahugh, Kilbeggan	52
SPS 21	Rahugh Primary School	Capparush, Rahugh, Kilbeggan	52
SPS 22	The Uisneach Inn Public House	Killarecastle, Killare, Mullingar	53
SPS 23	Boher Primary School	Boher, Streamstown, Mullingar	51
SPS 24	Loughnavalley Primary School	Adamstown, Loughnavalley, Mullingar	53
SPS 25	Fox's Public House	Togherstown, Loughnavalley, Mullingar	53
SPS 26	The New Forest Golf Club and Hotel	New Forest, Tyrrellspass	52
SPS 27	Excel Meats	Rostella, Kilbeggan	52
SPS 28	Derryvarragh Caravan Park	Donore, Multyfarnham	54
SPS 29	Wilson's Hospital School,	Multyfarnham	54
SPS 30	The Village Inn,	Ballymore	56
SPS 31	Killinure Chalets,	Glasson (Seasonal)	47
SPS 32	Portlick Inn,	Glasson	47
SPS 33	Temple Country House & Spa	Horseleap	55
SPS 34	Kates Diner,	Tyrrellspass	57
SPS 35	The Castle Pantry,	Tyrrellspass	57
SPS 36	Readyveg,	Tyrrellspass	57
SPS 37	Ballymore Community Centre Preschool	Ballymore	56
SPS 38	Mornington House B&B	Multyfarnham	54
SPS 39	Giggles Crèche, The Arches, Dunore,	Streamstown, Mullingar	55
SPS 40	Bernard Troy, Abattoir,	Rathnure ,Tyrrellspass	57
SPS 41	An Grianan Preschool,	Village View, Mount Temple	50
SPS42	Helen Mackey Home Bakery	Tree Lane, Martinstown, Collinstown	58

Table 3

3.0 Parameters to be Tested

- 3.1 The Health Service Executive heretofore has carried out full check and audit tests at the customer's taps. This has led to a lot of parameters being tested in a number of places, where the concentration of the parameters is not likely to change throughout the network. This clearly is not an efficient use of resources. The regulations allow for an alternative method of testing than has been used previously. A total of nineteen parameters can be monitored at the water treatment works. Two samples must be monitored there, namely Nitrites and Turbidity, as well as at the customer's tap. A sample at the water works for these parameters shall therefore satisfy the requirements to test at all other sampling points on the supply watermain network. There are twenty three parameters that must be tested at the customer's tap. The council proposes to change the nature of the tests by introducing new tests which allow for a lot of parameters to be tested at the treatment works. Parameters monitored at the plant will not be monitored throughout the network, except for Nitrite and Turbidity, and the results obtained for these parameters at the water treatment plant will be used to complete the annual returns to the EPA.

The permitted locations of all of the parameters to be tested are detailed in table 4. This table also states the location that the samples are to be taken and the reasons for specifying these locations.

	Parameter	Permitted Sampling Locations	Restrictions	Comments	Sampling Location Chosen
29	Aluminium	Customer's Tap	Customer's Tap only.		Customer's Tap
30	Ammonium	Customer's Tap	Customer's Tap only.		Customer's Tap
4	Antimony	Customer's Tap & Water Treatment Plant	Must be monitored at the customers tap where it occurs in significant concentrations.	Not detected in significant concentrations since commencement of these regulations.	Water Treatment Plant
5	Arsenic	Customer's Tap & Water Treatment Plant	Must be monitored at the customers tap where it occurs in significant concentrations.	Not detected in significant concentrations since commencement of these regulations.	Water Treatment Plant
6	Benzene	Customer's Tap & Water Treatment Plant	None		Water Treatment Plant
7	Benzo(a)pyrene	Customer's Tap	Customer's Tap only.		Customer's Tap
8	Boron	Customer's Tap & Water Treatment Plant	None		Water Treatment Plant
9	Bromate	Customer's Tap	Customer's Tap only when sodium hypochlorite is used as a disinfectant downstream of the treatment works.	Sodium hypochlorite is used as a disinfectant downstream of the treatment works.	Customer's Tap
10	Cadmium	Customer's Tap & Water Treatment Plant	Must be monitored at the customers tap where it occurs in significant concentrations.	Not detected in significant concentrations since commencement of these regulations.	Water Treatment Plant

	Parameter	Permitted Sampling Locations	Restrictions	Comments	Sampling Location Chosen
31	Chloride	Customer's Tap & Water Treatment Plant	None		Water Treatment Plant
11	Chromium	Customer's Tap & Water Treatment Plant	Must be monitored at the customers tap where it occurs in significant concentrations.	Not detected in significant concentrations since commencement of these regulations.	Water Treatment Plant
32	Clostridium Perfringens	Customer's Tap & Water Treatment Plant	None		Water Treatment Plant
44	Coliform Bacteria	Customer's Tap	Customer's Tap only.		Customer's Tap
43	Colony Count 22°	Customer's Tap	Customer's Tap only.		Customer's Tap
33	Colour	Customer's Tap	Customer's Tap only.		Customer's Tap
34	Conductivity	Customer's Tap & Water Treatment Plant	None		Water Treatment Plant
12	Copper	Customer's Tap	Customer's Tap only.		Customer's Tap
13	Cyanide	Customer's Tap & Water Treatment Plant	None		Water Treatment Plant
14	1-2 Dichloroethane	Customer's Tap & Water Treatment Plant	None		Water Treatment Plant
2	Enterococci	Customer's Tap	Customer's Tap only.		Customer's Tap
1	Escherichia Coli	Customer's Tap	Customer's Tap only.		Customer's Tap
16	Flouride	Customer's Tap & Water Treatment Plant	None		Water Treatment Plant

Parameter		Permitted Sampling Locations	Restrictions	Comments	Sampling Location Chosen
35	Hydrogen Ion Concentration	Customer's Tap	Customer's Tap only.		Customer's Tap
36	Iron	Customer's Tap	Customer's Tap only.		Customer's Tap
17	Lead	Customer's Tap	Customer's Tap only.		Customer's Tap
37	Manganese	Customer's Tap	Customer's Tap only.		Customer's Tap
18	Mercury	Customer's Tap & Water Treatment Plant	None		Water Treatment Plant
19	Nickel	Customer's Tap	Customer's Tap only.		Customer's Tap
20	Nitrate	Customer's Tap	Customer's Tap only.		Customer's Tap
21	Nitrite	Customer's Tap & Water Treatment Plant	Must be monitored at the Customer's Tap and the Water Treatment Plant.		Customer's Tap & Water Treatment Plant
38	Odour	Customer's Tap	Customer's Tap only.		Customer's Tap
22	Pesticides	Customer's Tap & Water Treatment Plant	None		Water Treatment Plant
23	Pesticides - Total	Customer's Tap & Water Treatment Plant	None		Water Treatment Plant
24	Polyaromatic Hydrocarbons	Customer's Tap	Customer's Tap only.		Customer's Tap
25	Selenium	Customer's Tap & Water Treatment Plant	Must be monitored at the customers tap where it occurs in significant concentrations.	Not detected in significant concentrations since commencement of these regulations.	Water Treatment Plant
41	Sodium	Customer's Tap	Customer's Tap only.		Customer's Tap

Parameter		Permitted Sampling Locations	Restrictions	Comments	Sampling Location Chosen
40	Sulphate	Customer's Tap & Water Treatment Plant	None		Water Treatment Plant
42	Taste	Customer's Tap	Customer's Tap only.		Customer's Tap
26	Tetrachloroethene & Trichloroethene	Customer's Tap & Water Treatment Plant	None		Water Treatment Plant
45	Total Organic Carbon	Customer's Tap & Water Treatment Plant	None		Water Treatment Plant
27	Trihalomethanes - Total	Customer's Tap	Customer's Tap only.		Customer's Tap
46	Turbidity	Customer's Tap & Water Treatment Plant	Must be monitored at the Customer's Tap and the Water Treatment Plant.		Customer's Tap & Water Treatment Plant
45	Total Organic Carbon	Customer's Tap & Water Treatment Plant	None		Water Treatment Plant

Table 5

3.2 The parametric values for Acrylamide, Epichlorohydrin and Vinyl Chloride are deemed to be compliant by product specification. All of the products used which may contain any of these parameters are included in the latest “List of Approved Products and Processes” published by the Drinking Water Inspectorate for England and Wales under their regulations.

3.3 Samples taken at the Water Treatment Plant in a month where Audit Monitoring is required (ATP)

In a month where Audit Monitoring is to occur, 22 parameters shall be sampled at the water treatment plant. These parameters will not change throughout the network and it is not considered necessary to test for these parameters at every sampling point in the supply. The results for these parameters at the water treatment plant can be inserted into the results taken at the sampling points to complete the check or audit monitoring records for any sampling location in the network. Table 2.1 details these parameters:

4	Antimony	5	Arsenic	6	Benzene
8	Boron	10	Cadmium	11	Chromium
13	Cyanide	14	1,2 Dichloroethane	16	Fluoride
18	Mercury	21	Nitrite	22	Pesticides
23	Pesticides – total	25	Selenium	26	Tetrachloroethene & Trichloroethene
31	Chloride	32	Clostridium Perfringens	34	Conductivity
40	Sulphate	45	Total Organic Carbon	46	Turbidity

Table 6

3.4 Samples taken at the Water Treatment Plant in a month where no Audit Monitoring is required (CTP)

In a month where no Audit Monitoring is required on a supply, 4 parameters shall be sampled at the water treatment plant. The results for these parameters at the water treatment plant can be inserted into the results taken at the sampling points to complete the check monitoring records for any sampling location in the network. Table 2.2 details these parameters.

21	Nitrite	32	Clostridium Perfringens	34	Conductivity
46	Turbidity				

Table 7

3.5 Audit Sample taken at the Sampling Point (AWN)

Samples taken at customer's taps for audit monitoring shall be tested for 24 parameters as per the following table. The results of test ATP can be added to these results to complete the Audit Monitoring records.

1	E-Coli	2	Enterococci	7	Benzo(a)pyrene
9	Bromate	12	Copper	17	Lead
19	Nickel	20	Nitrate	21	Nitrite
24	PAH	26	Tetrachloroethene & Trichloroethene	27	Trihalomethane - Total
29	Aluminium	30	Ammonium	33	Colour
35	pH	36	Iron	37	Manganese
38	Odour	41	Sodium	42	Taste
43	Colony count at 22°C	44	Coliform Bacteria	46	Turbidity

Table 8

3.6 Check Sample taken at the Sampling Point (CWN)

Samples taken at customer's taps for check monitoring shall be tested for 14 parameters as per the following table. The results of test ATP or CTP can be added to these results to complete the Check Monitoring records.

1	E-Coli	21	Nitrite	29	Aluminium
30	Ammonium	33	Colour	35	pH
36	Iron	38	Odour	42	Taste
44	Coliform Bacteria	46	Turbidity	37	Manganese
12	Copper	17	Lead		

Table 9

3.7 Sampling of Supplies $\leq 100 \text{ m}^3 / \text{day}$ (CSS)

The EPA's handbook on the implementation of these regulations states in paragraph 4.10 that the carrying out of full audit testing on small supplies $\leq 100 \text{ m}^3 / \text{day}$ is not an effective use of resources. It states that the sanitary authorities can carry out risk assessments on each these supplies to determine whether a parameter to be tested for in the audit tests are likely to exceed the parametric value and then add these parameters to the check test. Table 10 indicates the incidents of exceedence for each parameter over the previous three year period and shows the council's reasoning for addition or no addition to the parameters monitored as part of the check monitoring program of each parameter.

Parameter		Excedence	Comment
29	Aluminium	Various	Monitored in Check Monitoring.
30	Ammonium	No excedence	Monitored in Check Monitoring.
4	Antimony	No excedence	Do not add to the parameters monitored as part of the check monitoring.
5	Arsenic	No excedence	Do not add to the parameters monitored as part of the check monitoring.
6	Benzene	No excedence	Do not add to the parameters monitored as part of the check monitoring.
7	Benzo(a)pyrene	No excedence	Do not add to the parameters monitored as part of the check monitoring.
8	Boron	No excedence	Do not add to the parameters monitored as part of the check monitoring.
9	Bromate	No excedence	Do not add to the parameters monitored as part of the check monitoring.

Parameter		Excedence	Comment
10	Cadmium	No exceedences	Do not add to the parameters monitored as part of the check monitoring.
31	Chloride	No exceedences	Do not add to the parameters monitored as part of the check monitoring.
11	Chromium	No exceedences	Do not add to the parameters monitored as part of the check monitoring.
32	Clostridium Perfringens	Various	Monitored in Check Monitoring.
44	Coliform Bacteria	Various	Monitored in Check Monitoring.
43	Colony Count 22°	No exceedences	Do not add to the parameters monitored as part of the check monitoring.
33	Colour	No exceedences	Do not add to the parameters monitored as part of the check monitoring.
34	Conductivity	No exceedences	Do not add to the parameters monitored as part of the check monitoring.
12	Copper	Various	Added to the parameters monitored as part of the check monitoring.
13	Cyanide	No exceedences	Do not add to the parameters monitored as part of the check monitoring.

Parameter		Excedence	Comment
14	1-2 Dichloroethane	No exceedences	Do not add to the parameters monitored as part of the check monitoring.
2	Enterococci	Various	Monitored in Check Monitoring.
1	Escherichia Coli	Various	Monitored in Check Monitoring.
16	Flouride	Various	Monitored in Check Monitoring.
35	Hydrogen Ion Concentration	No excedence	Monitored in Check Monitoring.
36	Iron	Various	Monitored in Check Monitoring.
17	Lead	No excedence	Monitored in Check Monitoring.
37	Manganese	Various	Monitored in Check Monitoring..
18	Mercury	No excedence	Do not add to the parameters monitored as part of the check monitoring.
19	Nickel	No excedence	Do not add to the parameters monitored as part of the check monitoring.

Parameter		Excedence	Comment
20	Nitrate	No excedence	Do not add to the parameters monitored as part of the check monitoring.
21	Nitrite	No excedence	Monitored in Check Monitoring.
38	Odour	No excedence	Monitored in Check Monitoring.
22	Pesticides	No excedence	Do not add to the parameters monitored as part of the check monitoring.
23	Pesticides - Total	No excedence	Do not add to the parameters monitored as part of the check monitoring.
24	Polyaromatic Hydrocarbons	No excedence	Do not add to the parameters monitored as part of the check monitoring.
25	Selenium	No excedence	Do not add to the parameters monitored as part of the check monitoring.
41	Sodium	No excedence	Do not add to the parameters monitored as part of the check monitoring.
40	Sulphate	No excedence	Do not add to the parameters monitored as part of the check monitoring.
42	Taste	No excedence	Monitored in Check Monitoring.

Parameter		Excedence	Comment
26	Tetrachloroethene & Trichloroethene	No excedence	Do not add to the parameters monitored as part of the check monitoring.
45	Total Organic Carbon	No excedence	Do not add to the parameters monitored as part of the check monitoring.
27	Trihalomethanes - Total	No excedence	Do not add to the parameters monitored as part of the check monitoring.
46	Turbidity	Various	Monitored in Check Monitoring.

Table 10

The parameters to be tested for on small supplies (<100 m³ / day) shall be as per table 11 below.

1	E-Coli	9	Bromate	16	Flouride
21	Nitrite	29	Aluminium	30	Ammonium
33	Colour	35	pH	36	Iron
37	Manganese	38	Odour	42	Taste
44	Coliform Bacteria	46	Turbidity	17	Lead

Table 11

3.8 Small Private Supplies (< 10 m³ / day) and Supplying a Public or Commercial Activity (SPS)

The EPA handbook on the implementation of these regulations states that the council should carry out a risk assessment on each supply and determine what parameters are to be tested for. This is an onerous task and will involve considerable time and resources. The council wishes to test for a suite of parameters similar to those parameters tested for in processing well grants. Table 12 lists these parameters.

1	E-Coli	2	Enterococci	17	Lead
20	Nitrate	21	Nitrite	32	Clostridium Perfringens
33	Colour	35	pH	36	Iron
37	Manganese	38	Odour	42	Taste
44	Coliform Bacteria	46	Turbidity		

Table 12

3.9 Bacteriological Testing (BAC)

The 2008 programme will allow limited operational bacteriological testing in specific areas. The council consider that the following parameters be tested for in specific areas and at specific times where no other testing is to occur.

1	E-Coli	2	Enterococci	44	Coliform Bacteria
32	Clostridium Perfringens				

Table 13

3.10 Other Testing

The council will carry out other additional testing as advised by the Health Service Executive from time to time.

4.0 Frequency of Monitoring & Monitoring Program

4.1 The frequency of the monitoring has been determined by multiplying the population served by 200 l / day / person to give a volume of water per day per water supply zone. The frequency can then be determined by reference to the tables in the 2007 Regulations. Table 14 indicates the frequency of testing to be carried out on publicly sourced water supply schemes including group water supply schemes.

WSZ No.	Name of Scheme	Population served	m³/ day	Check	Audit	Map No.
Mullingar High Level Water Supply Scheme						
MHL 1	Frewin Hill High Level Reservoir	6,275	1,255	10	2	1
MHL 1b	Dysart Lilliput GWSS	135	27	2		2
MHL 2	Dysart Re-Chlorination Station	865	173	4	1	3
MHL 2a	Redmondstown / Conranstown GWSS	75	15	2		4
MHL 2b	Ballyhast GWSS	75	15	2		5
MHL 2c	Derryroe / Killard GWSS	120	24	2		6
MHL 2d	Toarlisnamore GWSS	90	18	2		7
MHL 2e	Raheenmore GWSS	60	12	2		8
MHL 2f	Shureen / Ballymacmorris GWSS	100	20	2		9
MHL 3	Gaybrook Water Tower	3,455	691	4	1	10
MHL 3a	Simonstown GWSS	115	23	2		11
MHL 3d	Raheenquill GWSS	60	12	2		12
MHL 4	Kilbeggan Reservoir	1,000	200	4	1	13
Mullingar Low Level Water Supply Scheme						
MLL 1	Frewin Hill Low Level Reservoir	5,485	1,097	10	2	14a 14b 14c
MLL 1a	Lisryan / Lismacaffrey GWSS	225	45	2		15
MLL 1c	Kilbixy GWSS	65	13	2		16
MLL 1d	Kilpatrick / Bunbrosna GWSS	90	14	2		17
MLL 1e	Ballinacarrigy / Emper GWSS	98	20	2		18
MLL 2	Mullaghmeehan Re-Chlorination station	900	180	4		21
MLL 1f	Moyvore GWSS	50	10	2		19

Note: MHL 1a, MHL 2g, MHL 3c and MLL 1b have been taken in charge by WCC during 2008 and are removed from the 2009 programme.

WSZ No.	Name of Scheme	Population served	m ³ / day	Check	Audit	Map No.
Mullingar Town Independent Water Supply Scheme						
MTI 1	Ardonagh Reservoir	12,940	2,588	13	2	22
MTI 1e	Clongowney GWSS	150	30	2		23
MTI 2	Killucan Reservoir	3,650	730	4	1	27
MTI 2d	Monganstown / Clonfad / Rathbawn GWSS	120	24	2		25
MTI 2e	Hodgestown GWSS	380	76	2		26
Athlone Water Supply Scheme						
ATH 1	Athlone Water Supply Scheme	19,990	3,998	14	3	27
ATH 1a	Clonbonny GWSS	375	75	2		28
ATH 1b	Moydrum / Baylin GWSS	80	16	2		29
ATH 1e	Coolvuck GWSS	130	26	2		30
ATH 1g	Garrynafela GWSS	100	20	2		31
Castlepollard High Level Water Supply Scheme						
CHL 1	Castlepollard High Level Water Supply Scheme	1,200	240	4	1	33
CHL 1b	Clonageeragh / Sallymount GWSS	55	11	2		34
CHL 1d	Ankerland Fore GWSS	150	30	2		35
CHL 1e	Cummerstown GWSS	165	33	2		36

Note: MTI 1a, MTI 1b, MTI 1f, MTI 2b, MTI 2c , ATH 1d, ATH 1f, CHL 1a and CHL 1c have been taken in charge by WCC during 2008 and are removed from the 2009 programme.

WSZ No.	Name of Scheme	Population served	m ³ / day	Check	Audit	Map No.
Castlepollard Low Level Water Supply Scheme						
CLL 1	Castlepollard Low Level Reservoir	4,280	856	4	1	37a 37b
CLL 1c	Gartlandstown GWSS	320	64	2		38
CLL 2	Delvin Re-Chlorination Station	1,250	250	4	1	39
Moate Water Supply Scheme						
MOA 1	Ardnapondra Reservoir	2,135	437	4	1	40
Ballinahown Water Supply Scheme						
BHN 1	Ballinahown Water Supply Scheme	100	20	2		41

Note: CLL 1d has been taken in charge by WCC during 2008 and are removed from the 2009 programme.

Note:

The sampling on External Water Supplies at Ballinahown (BHN) and Finea (FIN) will include CSS parameters and 3 additional Parameters (Conductivity, Clostridium Perfringens and Copper).

Table 14

Table 15 indicates the frequency of testing to be carried out on privately sourced group water supply schemes supplying greater than 10 m³ / day.

WSZ No.	Name of Scheme	Population served	m ³ / day	Check	Audit	Map No.
Multyfarnham Group Water Supply Scheme						
MUL 1	Multyfarnham Group Water Supply Scheme	800	160	4	1	42
Mount Temple Group Water Supply Scheme						
MTP 1	Mount Temple Group Water Supply Scheme	100	20	2	1	43
Lavagh / Ballyheelan Group Water Supply Scheme						
FIN 1	Lavagh / Ballyheelan Group Water Supply Scheme	150	30	2	1	44
Ballybroder Group Water Supply Scheme						
BBR 1	Ballybroder Group Water Supply Scheme	50	10	2	1	45

Table 15

- 4.2 The monitoring program is to be carried out in a manner as described in the tables 16 and 17. Table 16 details the tests to be carried out throughout the network and on the small supplies serving a public or commercial activity. Table 17 shows the tests to be carried out at the water treatment plants.

WSZ No.	WSZ Name	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
	Mullingar High Level Water Supply Scheme												
MHL 1	Frewin Hill High Level Reservoir	CWN	CWN	CWN	CWN	CWN	AWN	CWN	CWN	CWN	CWN	CWN	AWN
MHL 1b	Dysart Lilliput GWSS			CSS						CSS			
MHL 2	Dysart Re-Chlorination Station	AWN	CWN		BAC	CWN		CWN		BAC	CWN		
MHL 2a	Redmondstown / Conranstown GWSS				CSS						CSS		
MHL 2b	Ballyhast GWSS					CSS						CSS	
MHL 2c	Derryroe / Killard GWSS						CSS						CSS
MHL 2d	Toarlisnamore GWSS	CSS						CSS					
MHL 2e	Raheenmore GWSS		CSS						CSS				
MHL 2f	Shureen / Ballymacmorris GWSS			CSS						CSS			
MHL 3	Gaybrook Water Tower	CWN		BAC	CWN		BAC	CWN		AWN		BAC	CWN
MHL 3a	Simonstown GWSS					CSS						CSS	
MHL 3d	Raheenquill GWSS		CSS						CSS				
MHL 4	Kilbeggan Reservoir	CWN		CWN		BAC	AWN		BAC	CWN		CWN	

WSZ No.	WSZ Name	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
	Mullingar Low Level Water Supply Scheme												
MLL 1	Frewin Hill Low Level Reservoir	CWN	CWN	AWN	CWN	CWN	CWN	CWN	CWN	AWN	CWN	CWN	CWN
MLL 1a	Lisryan / Lismacaffrey GWSS		CSS						CSS				
MLL 1c	Kilbixy GWSS				CSS						CSS		
MLL 1d	Kilpatrick / Bunbrosna GWSS					CSS						CSS	
MLL 1e	Ballynacarrigy / Emper GWSS						CSS						CSS
MLL 1f	Moyvore GWSS	CSS						CSS					
MLL 2	Mullaghmeehan Re-Chlorination Station		CWN		BAC	CWN		CWN			BAC	CWN	

Note: MHL 1a, MHL 2g, MHL 3c and MLL 1b have been taken in charge by WCC during 2008 and are removed from the 2009 programme

WSZ No.	WSZ Name	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
	Mullingar Town Independent Water Supply Scheme												
MTI 1	Ardonagh Reservoir	CWN	CWN	AWN	CWN CWN	CWN	CWN	CWN CWN	CWN	AWN	CWN CWN	CWN	CWN
MTI 1e	Clongowney GWSS		CSS						CSS				
MTI 2	Killucan Reservoir		CWN		CWN			CWN			CWN		AWN
MTI 2c	Derrymore / Ballyhaw GWSS				CSS						CSS		
MTI 2d	Monganstown / Clonfad / Rathbawn GWSS					CSS						CSS	
MTI 2e	Hodgestown GWSS						CSS						CSS
WSZ No.	WSZ Name	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
	Athlone Water Supply Scheme												
ATH 1	Athlone Water Supply Scheme	CWN AWN	CWN	CWN	CWN CWN	CWN	CWN AWN	CWN	CWN	CWN CWN	CWN AWN	CWN	CWN
ATH 1a	Clonbonny GWSS	CSS						CSS					
ATH 1b	Moydrum / Baylin GWSS			CSS						CSS			
ATH 1e	Coolvuck GWSS					CSS						CSS	
ATH 1g	Garrynafela GWSS		CSS						CSS				

Note: MTI 1a, MTI 1b, MTI 1f, MTI 2b, ATH 1d and ATH 1f have been taken in charge by WCC during 2008 and are removed from the 2009 programme

WSZ No.	WSZ Name	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
	Castlepollard High Level Water Supply Scheme												
CHL 1	Castlepollard High Level Water Supply Scheme	CWN		CWN	BAC		AWN		CWN		BAC	CWN	
CHL 1b	Clonageeragh / Sallymount GWSS			CSS						CSS			
CHL 1d	Ankerland Fore GWSS					CSS						CSS	
CHL 1e	Cummerstown GWSS						CSS						CSS
	Castlepollard Low Level Water Supply Scheme												
CLL 1	Castlepollard Low Level Reservoir			AWN		CWN		CWN		CWN			CWN
CLL 1c	Gartlandstown GWSS		CSS						CSS				
CLL 2	Delvin Re-Chlorination Station	CWN			CWN			CWN			CWN	AWN	

WSZ No.	WSZ Name	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
	Moate Water Supply Scheme												
MOA 1	Ballinderry Water Supply Scheme		CWN		CWN		CWN		BAC	AWN		BAC	CWN
	Ballinahown Level Water Supply Scheme												
BHN 1	Ballinahown Water Supply Scheme		BAC			CSS			BAC			CSS	
	Multyfarnham Group Water Supply Scheme												
MUL 1	Multyfarnham Group Water Supply Scheme	CWN			CWN		CWN		AWN		CWN		
	Mount Temple Group Water Supply Scheme												
MTP 1	Mount Temple Group Water Supply Scheme	BAC		CSS		BAC		AWN		CSS		BAC	
	Lavagh / Ballyheelan Group Water Supply Scheme												
FIN 1	Lavagh / Ballyheelan Group Water Supply Scheme	BAC			CSS		AWN			BAC		CSS	
	Ballybroder Group Water Supply Scheme												
BBR 1	Ballybroder Group Water Supply Scheme	BAC		CSS		AWN			BAC		CSS		

Note: CHL 1a, CHL 1c, and CLL 1d have been taken in charge by WCC during 2008 and are removed from the 2009 programme

Note:

The sampling on External Water Supplies at Ballinahown (BHN) and Finea (FIN) will include CSS parameters and 3 additional Parameters (Conductivity, Clostridium Perfringens and Copper).

WSZ No.	WSZ Name	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
PRI 1	Fitzgerald's Public House		SPS						SPS				
PRI 2	Castledaly Primary School		SPS							SPS			
PRI 3	Glasson Golf & Country Club		SPS						SPS				
PRI 4	Kilcleagh Manor Hotel		SPS						SPS				
PRI 5	Toberclair Primary School		SPS							SPS			
PRI 6	Portlick Castle		SPS						SPS				
PRI 7	Milltown Primary School			SPS						SPS			
PRI 8	Sonna Primary School			SPS						SPS			
PRI 9	Castletown – Finea Primary School			SPS						SPS			
PRI 10	Murray's Public House		SPS						SPS				
PRI 11	Tang Primary School		SPS							SPS			
PRI 12	Drumraney Primary School		SPS							SPS			
PRI 13	Ardnagrath Primary School		SPS							SPS			
PRI 14	Mount Temple Golf Club		SPS						SPS				
PRI 15	Rosemount Primary School		SPS							SPS			
PRI 16	Three Jolly Pidgeons Public House			SPS						SPS			
PRI 17	The Stile Public House		SPS						SPS				
PRI 18	Streamstown Primary School			SPS						SPS			
PRI 19	The Beach Tree Public House			SPS						SPS			
PRI 20	The Hazel Public House			SPS						SPS			
PRI 21	Rahugh Primary School			SPS						SPS			
PRI 22	The Uisneach Inn Public House			SPS						SPS			
PRI23	Boher Primary School			SPS						SPS			
PRI 24	Loughnavalley Primary School			SPS						SPS			
PRI 25	Fox's Public House			SPS						SPS			
PRI 26	The New Forest Golf Club and Hotel			SPS						SPS			
PRI 27	Excel Meats			SPS						SPS			
PRT28	Derryvarragh Caravan Park			SPS						SPS			
PRT29	Wilsons Hospital School, Multyfarnham			SPS						SPS			
PRT30	The Village Inn, Ballymore			SPS						SPS			
PRT31	Killinure Chalets, Glasson (Seasonal)		SPS						SPS				
PRT32	Portlick Inn, Glasson		SPS						SPS				

WSZ No.	WSZ Name	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
PRT33	Temple Country House & Spa, Horseleap		SPS						SPS				
PRT 34	Kates Diner, Tyrrellspass			SPS						SPS			
PRT 35	The Castle Pantry, Tyrrellspass			SPS						SPS			
PRT 36	Readyveg, Tyrrellspass			SPS						SPS			
PRT 37	Ballymore Community Centre Preschool			SPS						SPS			
PRT 38	Mornington House B&B, Multyfarnham			SPS						SPS			
PRT 39	Giggles Crèche, The Arches, Dunore, Streamstown, Mullingar		SPS						SPS				
PRT 40	Bernard Troy, Abattoir, Rathnure Tyrrellspass			SPS						SPS			
PRT 41	An Grianan Preschool, Mount Temple			SPS					SPS				
PRT 42	Helen Mackey Bakery, Collinstown			SPS						SPS			

Properties in red are closed and not operating, therefore do not require any testing.

Table 16

WSZ No.	WSZ Name	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
	Portloman Water Treatment Plant	CTP	CTP	ATP	CTP	CTP	ATP	ATP	CTP	ATP	CTP	CTP	ATP
	Athlone Water Treatment Plant	ATP	CTP	CTP	CTP	CTP	ATP	CTP	CTP	CTP	ATP	CTP	CTP
	Ballany Water Treatment Plant	CTP		ATP	CTP	CTP	ATP	CTP		CTP	CTP		CTP
	Moate Water Treatment Plant		CTP		CTP		CTP			ATP			CTP
	Multyfarnham GWSS Water Treatment Plant	CTP			CTP		CTP		ATP		CTP		
	Mount Temple GWSS Water Treatment Plant			CTP				ATP		CTP			
	Lavagh/Ballyheelan GWSS Water Treatment Plant				CTP		ATP					CTP	
	Ballybroder GWSS Water Treatment Plant			CTP		ATP					CTP		

Table 17

5.0 Compliance Monitoring

5.1 Protocol for selection of Consumers' Taps for Compliance Monitoring

- 5.1.1 The EPA Handbook advises that the premises selected for compliance monitoring should be pre-determined at the start of each sampling year. However, in practise it is not practicable to pre-select premises at the start of the year as there may not be any response at the selected premises on the day the sample is to be taken, or the sampling point may not be suitable. What is proposed however is that the area of the sample is predetermined as per table 16 and that the sampler would select a suitable location within that area on the sampling date. Within each geographic area sample points should be selected from a domestic dwelling, a public building or a food production undertaking. The sample locations selected must be at the point where the water is normally used for the consumption of water. Each sample point selected within the supply zone should be unique (i.e. no sample point should be revisited during the year).
- 5.1.2 The sampling shall be carried out throughout the year as per tables 16 and 17.
- 5.1.3 On arrival at the selected sample location, take the sample (note there may be more than one sample bottle to be collected depending on the parameters being determined) from a typical premises for which access can be obtained. In a domestic premises, collect the sample from the kitchen tap (samples must not be collected from outside taps). In a non-domestic premises, collect the sample from one of the taps normally used for human consumption. Where more than one tap is normally used for human consumption, ask the owner or manager of the premises to declare the tap that is most frequently used for human consumption and collect the sample from that tap. Most of the premises sampled should be domestic premises. However a proportion of the samples should be taken from non-domestic properties. In a water supply zone where, say more than 10 premises have to be sampled in the year, at least one of those samples should be taken from a non-domestic premises, preferably one in which water is supplied to the public such as a school, hospital, restaurant or like establishment.
- 5.1.4 If possible, note the grid reference of each selected premises to facilitate record of drinking water quality information on Geographic Information Systems.

5.2 Protocol for taking Compliance Samples from Treatment Works

5.2.1 Sample the water leaving each treatment works for nitrite at the check monitoring frequency against the standard of 0.1 mg / l and sample the water leaving each treatment works treating surface water for turbidity at the check monitoring frequency against the indicator parameter value of 1 NTU. Surface water includes groundwaters that are significantly influenced by surface water. Compliance samples for turbidity are not required from the water leaving treatment works treating groundwaters. Sample (or measure on site) for residual disinfectant (free and total chlorine) at each treatment works where disinfection is practised.

5.3 Pesticide Monitoring Strategy

5.3.1 The EPA Handbook advises that a pesticide monitoring strategy should be developed so that only those pesticides are monitored that are used in significant amounts within the catchment of each water source and are likely to be present in the water that is abstracted for drinking water supply.

5.3.2 Pesticide monitoring strategy:

- (a) Consult annually the following:
 - Department of Agriculture (Pesticides Unit);
 - local farming groups and farmers; and
 - local authorities;
 - and list those pesticides used in significant amounts.
- (b) Consult the same organisations about the properties of these pesticides to assess whether any are likely to reach water sources following use.
- (c) Check the results of previous monitoring for pesticides for each surface water source carried out under S.I. 294 of 1989.
- (d) Check the results of any monitoring of water sources for pesticides carried out by EPA or other organisations.
- (e) Check the results of any monitoring of drinking water supplies for pesticides carried out under the previous Regulations (S.I. 81 of 1988) or under these Regulations (S.I. 439 of 2000).
- (f) Identify any pesticide for which a treatment process has been installed to remove it.

5.3.3 On the basis of the above the following pesticides are to be monitored at consumers' taps in each water supply zone or at each

treatment works (note: there may be different pesticides monitored in different zones/works).

- 5.3.4 Towards the end of each year repeat 5.3.2 above, consider the results obtained in 5.3.3 above and if necessary modify the pesticides monitoring programme for the following year. A pesticide may be dropped from the monitoring programme if it has not been detected in the water supply or water source for three years.

5.4 Operational Sampling at Consumers' Taps

- 5.4.1 Operational samples are required to be taken from consumers' taps as per table 16 and otherwise directed by the Health Service Executive.

- 5.4.2 Take each operational sample in the appropriate bottle using the appropriate sampling procedure (see Microbiological and chemical sampling procedures and Appendix 1 - Sample bottles, preservation and storage). Label each operational sample uniquely and clearly as an operational sample.

- 5.4.3 Operational samples for specific parameters from consumers' taps may also be required in the following circumstances and in accordance with the specified procedure:

- (a) Investigations of non-compliances with the standards in Tables A and B of part 1 of the schedule to the 2000 Regulations or exceedences of indicator parameter values in Table C of part 1 of the schedule to the 2000 Regulations.
- (b) Investigations of water quality complaints received from consumers.
- (c) Investigations when there is an incident or emergency affecting water supplies - see emergency procedures manual as recommended in paragraph 8.4 of the EPA Handbook.

5.5 Operational Samples from Water Treatment Works

- 5.5.1 Operational samples for specific parameters from water treatment works may also be required in the following circumstances and in accordance with the specified procedure:

- (a) Investigations of non-compliances with the standards in Tables A and B of part 1 of the schedule to the 2000 Regulations or exceedences of indicator parameter values in Table C of part 1 of the schedule to the 2000 Regulations.

- (b) Investigations of water quality complaints received from consumers.
- (c) Investigations when there is an incident or emergency affecting water supplies - see emergency procedures manual as recommended in paragraph 8.4 of the EPA Handbook.

5.5.2 Take each operational sample from the point specified, in the appropriate bottle using the appropriate sampling procedure (see Microbiological and chemical sampling procedures and Appendix 1 - Sample bottles, preservation and storage). Label each operational sample uniquely and clearly as an operational sample.

5.6 Operational Samples from Service Reservoirs

5.6.1 Operational samples for specific parameters from service reservoirs and water towers may also be required in the following circumstances and in accordance with the specified procedure:

- (a) Investigations of non-compliances with the standards in Tables A and B of part 1 of the schedule to the 2000 Regulations or exceedences of indicator parameter values in Table C of part 1 of the schedule to the 2000 Regulations.
- (b) Investigations of water quality complaints received from consumers.
- (c) Investigations when there is an incident or emergency affecting water supplies - see emergency procedures manual as recommended in paragraph 8.4 of the EPA Handbook.

5.6.2 Take each operational sample from the point specified, in the appropriate bottle using the appropriate sampling procedure (see Microbiological and chemical sampling procedures and Appendix 1 - Sample bottles, preservation and storage). Label each operational sample uniquely and clearly as an operational sample.

6.0 Microbiological and Chemical Sampling Procedures

6.1 References

- 6.1.1 The European Communities (Drinking Water) Regulations, 2007 (S.I. 278 of 2007).
- 6.1.2 Handbook on Implementation [of S.I. 439 of 2000] for Sanitary Authorities published by the Environmental Protection Agency (EPA) in 2003.
- 6.1.3 The European Communities (Quality of Surface Water Intended for the Abstraction of Drinking Water) Regulations, 1989 (S.I. 294 of 1989).
- 6.1.4 Handbook on Implementation [of S.I. 294 of 1989] for Sanitary Authorities published by the Environmental Research Unit of the Department of the Environment in 1990.
- 6.1.5 The Microbiology of Drinking Water (2002) – Part 2 – Practices and procedures for sampling, issued by the Standing Committee of Analysts in the UK and published by the Environment Agency in 2002.

6.2 Principles

6.2.1 Microbiological parameters

The tap to be sampled for drinking water is cleaned by flushing and disinfecting and a sample of water collected into a pre-sterilised container. Sodium thiosulphate is present in the sample container to neutralise any chlorine in the sample and prevent sample deterioration. Surface water samples are collected into pre-sterilised containers.

6.2.2 Chemical and other parameters

Water from the drinking water tap to be sampled or the surface water is collected into a clean sample container that may be glass or plastic depending on the parameter. The sample may be collected directly from the tap without flushing (for non-conservative parameters) or it may be flushed before collecting the sample (for conservative parameters). For particular parameters the sample container may be pre-dosed with preserving chemicals or preserving chemicals may be added to the sample immediately on receipt in the laboratory.

6.3 Special Instructions

6.3.1 Identification of samples

6.3.1.1 It is essential to ensure the integrity and security of each sample from collection to reporting of the results. This includes the ability to trace possession and handling of each sample from the time of collection through analysis and final disposal. Sample labels must be used to prevent sample misidentification. All samples will require a written label indicating at least the date, location of collection of the sample and the purpose of the sample. Labels must be completed at the time of sample collection.

6.3.1.2 Each sample bottle must be given a unique identifier and all relevant information, as laid out below, must be recorded on a sample round sheet or a sampler's work list. The relevant sampling round sheet must accompany all pre-scheduled compliance and operational samples. Compliance and operational samples must be clearly and separately identified. This round sheet must contain the sampling date, time, address and results of on-site determinations, and must be initialled by the sampler. The round sheet must also contain details of all sampling equipment used in the collection of samples and on-site tests e.g. residual chlorine meters and thermometers. Any observations considered relevant by the sampler should also be recorded on the round sheets. A sample submission sheet that is completed at time of sampling must accompany any scheduled operational samples and non-scheduled samples (such as investigational samples). Mistakes on the round sheet or submission sheet should be crossed through once only, the correct information entered and the sampler must initial any alteration. **Corrective fluid must not be used.**

6.3.2 Location of samples

6.3.2.1 The sampler must ascertain the exact address or other location for each sample. This should be on the sample round sheet or a sampler's work list. Pre-scheduled compliance samples should be taken from a specified area. The sampler is free to choose the address in the street or area from which the sample is taken. The sampler must record the actual address sampled on the sample round sheet and the sample bottle label.

6.3.3 Sampling principles

6.3.3.1 Samples must only be taken in bottles prepared and supplied by the laboratory. Samples must be obtained that meet the requirements of the sampling program and are representative of the water being sampled. Samples must be taken in such a way that there is no contamination during the sampling process and they must be handled, stored and transported in such a way that they do not deteriorate or become contaminated before they reach the laboratory.

6.3.3.2 Due to the complex and unstable nature of many water samples, it is almost always advisable, and in many cases essential, that samples are analysed as soon as possible after collection. All samples should be delivered to the laboratory as soon as practicable on the day of collection. Changes in the chemical and bacteriological content of the water can be minimised by storing and transporting the samples in a cool, dark place.

6.3.4 Consumer security

6.3.4.1 All samplers must carry identity cards with their name, the name of their organisation and a telephone number at which their identity can be confirmed. This identity card must always be shown when requesting permission to take samples from a consumer's tap, irrespective of whether the consumer has requested it. The consumer must be given the opportunity to check the sampler's identity by telephoning the specified number. Samplers must extend courtesy to consumers at all times.

6.4 Microbiological Parameters – Sampling Procedures

6.4.1 Equipment and reagents

- 6.4.1.1 Pre-sterilised microbiological bottles and sample bottle holders for sampling from taps (see appendix 1 for details of bottles and preservatives).
- 6.4.1.2 Pre-sterilised microbiological bottles and dip sample bottle holders for sampling from surface waters and from service reservoirs
- 6.4.1.3 Clean, narrow bore, bagged, standpipe with non-return valve.
- 6.4.1.4 Valve keys.
- 6.4.1.5 Swabs (for cleaning the taps).
- 6.4.1.6 Propane/Butane gas burner.
- 6.4.1.7 Temperature data logger in sampling van or maximum/minimum thermometer.
- 6.4.1.8 Disinfectant wipes e.g. 2-propanol.
- 6.4.1.9 Small stiff bristle brush.
- 6.4.1.10 Small plastic beaker.
- 6.4.1.11 A suitable disinfectant solution e.g. 10% Chlorox (sodium hypochlorite) (nominal 1% free chlorine) solution. **Note:** chlorine solutions cause burns to the eyes and skin, bleaching, internal irritation and damage, and can evolve toxic fumes. Safety glasses must be worn when using chlorine solutions and care taken to avoid skin contact and inhalation of the fumes. Any spillage must be cleaned up immediately.

6.4.2 Compliance sampling from consumers' taps

- 6.4.2.1 These samples are taken to determine compliance with the standards and indicator parameter values in the 2000 Regulations. Samples for microbiological parameters must be collected after collecting any samples for chemical and other parameters and carrying out any on-site tests for chemical and other parameters (for example, chlorine residual, pH or temperature). Before collecting any

samples, the consumer's tap must be cleaned and disinfected.

6.4.2.2 Remove all external fittings from the tap, such as hoses or anti-splash devices.

When sampling from a metal tap follow the instructions below.

- If the outside of the tap is dirty / greasy, clean with a swab soaked in the disinfectant solution or by use of a 2-propanol soaked wipe.
- Disinfect the tap by heating the spout end only of the tap using the propane/butane burner and taking care to avoid damaging the tap.
- Run the water through the tap to waste until the water is cool.
- Remove the top of the pre-sterilised microbiological bottle, taking care not to put it down.
- Fill the bottle with the sample to the fill line, where applicable, ensuring a suitable air gap is left. Care should be taken not to let it overflow or the top become contaminated by splashes or handling. Replace the top.
- Ensure that the sample is given a unique identifier and record all relevant information on the bottle label and on the sampling round sheet or sampler's work list.

When sampling from a plastic tap or a metal tap with a plastic insert that cannot be removed readily, follow the instructions below.

- If the outside of the tap is dirty / greasy, clean with a swab soaked in the disinfectant solution or by use of a 2-propanol soaked wipe. Otherwise, clean the tap using a stiff bristle brush and/or disinfect the tap by swabbing the outside of the tap and as much of the inside as is possible, with the chlorox solution. Disinfection swabs should fit snugly within the spout to ensure maximum contact with all surfaces.

- Alternatively, use a wash bottle or similar device filled with chlorox solution to spray the outside of the tap and to inject inside the tap spout. Where conditions do not allow chlorine solutions to be sprayed, use a small plastic beaker containing chlorox solution. Immerse the end of the tap in the solution for approximately 10 seconds.
- Wait for 2-3 minutes to allow complete disinfection.
- Rinse the outside of the tap with water to ensure that there is no liquid residual disinfection solution left on the outside of the tap. Run the water through the tap to waste for a sufficient period to flush out all traces of the disinfectant solution from the tap. Where dual spout mixer taps are used for sampling, ensure that both hot and cold outlets are flushed for a sufficient period.
- Measure the chlorine residual of the water (at both hot and cold outlets when mixer taps are used). If the residual exceeds the expected value for the water supply zone, flush the tap(s) further and measure the residual chlorine again until the value is what would be expected for the zone.
- Remove the top of the pre-sterilised microbiological bottle, taking care not to put it down.
- Fill the bottle with the sample to the fill line, where applicable, ensuring a suitable air gap is left. Care should be taken not to let it overflow or the top become contaminated by splashes or handling. Replace the top.
- Ensure that the sample is given a unique identifier and record all relevant information on the bottle label and on the sampling round sheet or sampler's work list.

6.4.3 Operational and Investigational Samples from Hydrants

6.4.3.1 Operational samples may be taken from hydrants to determine the microbiological quality of the water in the Sanitary Authority's or a private water supplier's distribution system. Investigational samples may be taken from hydrants to assist in determining the cause of non-compliance with a microbiological parameter in a sample

taken from a consumer's tap or as part of the investigation into an incident affecting drinking water quality. Before collecting any samples, the hydrant and standpipe must be cleaned and disinfected.

6.4.3.2. Follow the instructions below for sampling from hydrants.

- Remove the hydrant cover, visually inspect the chamber for debris and water and, if necessary, clear all debris from the chamber.
- Place the valve key on the valve and gently open the valve by turning the key. Allow the hydrant bowl to flush out then shut the valve.
- Attach the standpipe to the hydrant bowl and gently open the valve and tap to allow water to flow from it. Continue with this flushing until the water runs clear, and then measure the chlorine content of the water.
- Remove the standpipe from the hydrant and displace a small volume of water from the hydrant bowl and pour in the chloros solution.
- Re-attach the standpipe and slowly open the valve on the hydrant. Open the tap on the standpipe until the water containing the chloros solution starts to run out. Close the tap.
- Leave the standpipe to stand for about five minutes to allow disinfection of the standpipe.
- Open the tap fully and allow the water to run to waste until the measured chlorine levels are at the same level as measured in the third bullet above. Close the tap.
- Where the sample point allows, commence heating the nozzle end of the tap with the propane/butane burner and work back to the body of the tap until the water held within the spout boils. Care should be taken to avoid injury with any boiling water that may be emitted from the end of the tap.
- After flaming, run the tap to waste until the water is cool.

- Remove the top of the pre-sterilised microbiological bottle, taking care not to put it down.
- Fill the bottle with the sample to the fill line, where applicable, ensuring a suitable air gap is left. Care should be taken not to let it overflow or the top become contaminated by splashes or handling. Replace the top.
- Ensure that the sample is given a unique identifier and record all relevant information on the bottle label and on the sampling round sheet or sampler's work list.
- Close the tap on the standpipe and then shut off the valve on the hydrant. Remove the standpipe and allow it to drain, replace the hydrant cover.

6.4.4 Investigational samples from boundary boxes

6.4.4.1 Investigational samples may be taken from boundary boxes when such boxes are available, to assist in determining whether the cause of a non-compliance with a microbiological parameter in a sample taken from a consumer's tap is caused by the quality of water supplied by the Sanitary Authority or private water supplier or whether it is caused by the condition or maintenance of the consumer's domestic pipe work and fittings. Before taking any samples the tap must be cleaned and disinfected.

6.4.4.2 Follow the instructions below for sampling from boundary boxes.

- Unscrew the boundary box lid and assemble the stand and pipe work, removing the end cap from the brass spout.
- Open the valve using the key provided and flush at a steady constant rate for at least 2-3 minutes. Close the valve.
- Where the sample point allows, commence heating the nozzle end of the tap with the propane/butane burner and work back to the tap until the water held within the spout boils. Care should be taken to avoid injury with any boiling water that may be emitted from the end of the tap.

- Run the water through the tap to waste until the water is cool.
- Remove the top of the pre-sterilised microbiological bottle, taking care not to put it down.
- Fill the bottle with the sample to the fill line, where applicable, ensuring a suitable air gap is left. Care should be taken not to let it overflow or the top become contaminated by splashes or handling. Replace the top.
- Ensure that the sample is given a unique identifier and record all relevant information on the bottle label and on the sampling round sheet or sampler's work list.
- Close the valve. Replace the end cap on the brass spout. Dismantle the stand and pipe work and then replace the boundary box lid.

6.4.5 Operational and investigational samples from water treatment works and service reservoirs

6.4.5.1 Operational samples may be taken from water treatment works determine the microbiological quality of the water leaving the works and to check that any disinfection treatment process is operating effectively and from service reservoirs (and water towers) to determine the microbiological quality and to check for ingress of contamination. Investigational samples may be taken from water treatment works and service reservoirs (and water towers) to assist in determining the cause of non-compliance with a microbiological parameter in a sample taken from a consumer's tap or as part of the investigation into an incident affecting drinking water quality. Before collecting any samples, any sampling tap must be cleaned and disinfected.

6.4.5.2 Follow the instructions below for sampling from a metal tap at water treatment works where water is running continuously from the tap.

- Do not turn off the tap or adjust the flow during the sampling procedure.
- Thoroughly flame the outside of the tap using the propane/butane burner with the water running.

- Remove the top of the pre-sterilised microbiological bottle, taking care not to put it down.
- Fill the bottle with the sample to the fill line, where applicable, ensuring a suitable air gap is left. Care should be taken not to let it overflow or the top become contaminated by splashes or handling. Replace the top.
- Ensure that the sample is given a unique identifier and record all relevant information on the bottle label and on the sampling round sheet or sampler's work list.

6.4.5.3 Follow the instructions below for sampling from other metal taps at water treatment works and service reservoirs (and water towers).

Where the sample point allows, commence heating the nozzle end of the tap with the propane/butane burner and work back to the body of the tap until the water held within the spout boils. Care should be taken to avoid injury with any boiling water that may be emitted from the end of the tap.

- After flaming, run the tap to waste until the water is cool.
- Remove the top of the pre-sterilised microbiological bottle, taking care not to put it down.
- Fill the bottle with the sample to the fill line, where applicable, ensuring a suitable air gap is left. Care should be taken not to let it overflow or the top become contaminated by splashes or handling. Replace the top.
- Ensure that the sample is given a unique identifier and record all relevant information on the bottle label and on the sampling round sheet or sampler's work list.

6.4.5.4 Ideally all service reservoirs (and water towers) should be fitted with metal sampling taps on the outlet pipe from the reservoir or tower. However if they are not, the only way to obtain a sample is by dip sampling. Great care must be taken to ensure that no contamination is caused by the act

of dip sampling. This includes clearing any loose material away from hatches before opening, and keeping dippers and bottles scrupulously clean. Special sampling equipment consisting either of a bottle-holder with attached clean chain, rope or string, and with a bottle secured in situ, that has previously been sealed and steam-sterilised; or a sampling vessel with attached clean chain, rope or string, that has previously been sealed and steam-sterilised. **All of these items must be handled aseptically to avoid contamination of both the sample and the body of water under test. The items must be used only once before disposal or re-sterilisation.** The dipped sample should be representative of the full depth of water and not taken directly from the surface. Follow the instructions below for taking dip samples from service reservoirs (and water towers).

- If a bottle holder is used (or sample bottle that has been sterilised with a length of string attached), unseal it aseptically and carefully remove the top from the bottle without touching any part of the apparatus except via the wrapping. Further unwrap the equipment and gradually lower it until it is just **above** the surface of the water. Now release sufficient rope to allow the sample bottle to drop rapidly through the depth of the water and then steadily haul it back to the surface so the bottle fills as it rises. Lift the bottle carefully from the water and replace the top. This should be carried out away from the access cover to avoid sample/waste falling back into the reservoir.
- Alternatively if a sampling vessel is used, unseal it aseptically and lower it into the body of water to collect the sample; withdraw it carefully from the water and put it down only in contact with the inside of the sterile wrapping previously removed. Take care not to touch the inside of the sampling vessel, remove the top from the sample bottle without putting the top down. Pour the water into the bottle, taking care not to overfill, and replace the top. This should be carried out away from the access cover to avoid sample/waste falling back into the reservoir.
- Ensure that the sample is given a unique identifier and record all relevant information on the bottle label and on the sampling round sheet or sampler's work list.

6.4.6 Investigational Samples from Consumers' Taps

6.4.6.1 Investigational samples may be taken from consumers' taps to assist in determining the cause of non-compliance with a microbiological parameter in a sample taken from a consumer's tap or when investigating consumer complaints about drinking water quality. The samples taken may be a swab sample, a sample of water before disinfection of the tap and a sample of the water after disinfection of the tap. It is essential that the samples be taken in that order.

6.4.6.2 Follow the instructions below for taking a swab sample.

- The tap must **not** be disinfected or flushed and any inserts must **not** be removed before swabbing.
- Carefully remove the swab from its protective tube; do not put the tube down. Avoid touching the swab against hands or surfaces as this may contaminate the sterile swab.
- Place the swab inside the spout of the tap and rub it around the inside surfaces several times. Remove the swab and carefully replace the swab in its protective tube.
- Ensure that the sample is given a unique identifier and record all relevant information on a sampling round sheet or sampler's work list.

6.4.6.3 Follow the instructions below for taking first the water sample before disinfection and then the water sample after disinfection.

- The tap must not be disinfected or flushed and any inserts must not be removed before taking the sample before disinfection.
- Remove the top of the pre-sterilised microbiological bottle, taking care not to put it down.
- Fill the bottle with the sample to the fill line, where applicable, ensuring a suitable air gap is left. Care should be taken not to let it overflow or the top become contaminated by splashes or handling. Replace the top.

- Ensure that the sample is given a unique identifier and record all relevant information on the bottle label and on the sampling round sheet or sampler's work list.
- The tap must be cleaned and disinfected before taking the sample after disinfection.
- Follow the procedure in 6.4.2.2 above appropriate to the type of tap (metal, plastic or metal with plastic insert).
- Ensure that the sample is given a unique identifier and record all relevant information on the bottle label and on the sampling round sheet or sampler's work list.

6.4.7 Storage and Transport

- 6.4.7.1 All compliance, operational and investigational samples for microbiological parameters must be stored in the dark in insulated containers containing frozen ice packs or transported under refrigeration at a temperature range between 2°C and 8°C.
- 6.4.7.2 For sampling vehicles with a refrigeration unit, the temperature within the refrigeration unit is monitored throughout the sampling run by taking temperature readings at the start, middle and end of the day's sampling using an externally mounted digital thermometer. Where a cool box is used, the maximum and minimum temperatures are logged. All temperature readings must be recorded on an appropriate daily log sheet.
- 6.4.7.3 For sampling vehicles not equipped with a refrigeration unit, at the start of the sample run place an adequate number of ice packs into the cool box. Store the bottle containing the maximum/minimum thermometer or temperature probe in the cool box. When the first sample is placed into the cool box, record the time and current (minimum) temperature reading on the daily log sheet. At the end of the sampling run when the samples are removed from the cool box and delivered to the laboratory, record the time and the current (maximum) temperature.
- 6.4.7.4 The temperature of the refrigeration unit or cool box must be, and remain within, the range of 2°C to 8°C. If the temperature of the refrigeration unit is outside this temperature range, contact your supervisor for instructions.

6.4.7.5 Every effort should be made to deliver the samples to the laboratory as quickly as is possible on the same day. In exceptional circumstances, if this cannot be done the samples must be stored in the dark and kept cool (2°C to 8°C) and delivered to the laboratory within twenty four hours at the latest.

6.4.7.6 Clean the refrigeration units and cool boxes using a disinfectant solution (chlorox). This must be carried out at least monthly, or more frequently if the units or cool boxes are showing signs of deterioration/soiling. As a check on cleanliness, swab samples should be taken from internal surfaces of units or cool boxes and analysed for selected microbiological parameters each month.

6.5 Chemical and Other Parameters – Sampling Procedures

6.5.1 Equipment and Reagents

6.5.1.1 Pre-cleaned (where necessary) bottles appropriate for the particular parameter or parameters being sampled (see appendix 1 for details of the bottles and any preservatives).

6.5.1.2 Disposable plastic syringe (for sampling for dissolved metals)

6.5.1.3 0.45 µm Polysulphone membrane disposable filter device (for sampling for dissolved metals).

6.5.2 Compliance Sampling From Consumers' Taps

6.5.2.1 These samples are taken to determine compliance with the standards and indicator parameter values in the 2000 Regulations. Samples for chemical and other parameters must be collected before collecting any samples for microbiological parameters. If a sample is required for lead, copper and nickel, this sample must be taken before samples are taken for the other chemical and other parameters.

6.5.2.2 Follow the instructions below for the relevant parameters.

- For lead, copper and nickel, do not flush the tap. Collect the first 1 litre of water that issues from the tap when it is turned on in the appropriate bottle.
- For all the other parameters, collect the sample or samples into the appropriate bottles.

Notes. For some parameters the bottles should be rinsed with the water to be sampled before collecting the sample. For other parameters the bottles **must not** be rinsed before collecting the samples, particularly when a preservative is present in the sample bottle. For some parameters the bottles **must** be filled completely so there is no air gap. When collecting samples for the organic parameters (such as pesticides, chlorinated solvents, PAH etc) the sampler **must not** wear plastic gloves. Full details of the bottles and sampling requirements are given in appendix 1.

- Ensure that each sample is given a unique identifier and record all relevant information on a sampling round sheet or sampler's work list.

6.5.3 Operational and Investigational Samples from Hydrants

6.5.3.1 Operational samples may be taken from hydrants to determine the chemical quality of the water in the Sanitary Authority's or a private water supplier's distribution system. Investigational samples may be taken from hydrants to assist in determining the cause of non-compliance with a chemical or other parameter in a sample taken from a consumer's tap or as part of the investigation into an incident affecting drinking water quality. Before collecting any samples, the hydrant and standpipe must be cleaned.

6.5.3.2. Follow the instructions below for sampling from hydrants.

- Remove the hydrant cover, visually inspect the chamber for debris and water and, if necessary, clear all debris from the chamber.
- Place the valve key on the valve and gently open the valve by turning the key. Allow the hydrant bowl to flush out then shut the valve.
- Attach the standpipe to the hydrant bowl and gently open the valve and tap to allow water to flow from it. Continue with this flushing until the water runs clear.
- Collect the sample or samples for the relevant parameter or parameters into the appropriate bottles (see appendix 1 for details).

- Ensure that each sample is given a unique identifier and record all relevant information on a sampling round sheet or sampler's work list.
- Close the valve. Replace the end cap on the brass spout. Dismantle the stand and pipe work and then replace the boundary box lid.

6.5.4 Investigational Samples from Boundary Boxes

6.5.4.1 Investigational samples may be taken from boundary boxes to assist in determining whether the cause of a non-compliance with a chemical or other parameter in a sample taken from a consumer's tap is caused by the quality of water supplied by the Sanitary Authority or private water supplier or whether it is caused by the condition or maintenance of the consumer's domestic pipe work and fittings. Before taking any samples the tap must be flushed.

6.5.4.2 Follow the instructions below for sampling from boundary boxes.

- Unscrew the boundary box lid and assemble the stand and pipe work, removing the end cap from the brass spout.
- Open the valve using the key provided and flush at a steady constant rate for at least 2-3 minutes.
- Collect the sample or samples for the relevant parameter or parameters into the appropriate bottles (see appendix 1 for details).
- Ensure that each sample is given a unique identifier and record all relevant information on the bottle label and on the sampling round sheet or sampler's work list.
- Close the valve. Replace the end cap on the brass spout. Dismantle the stand and pipe work and then replace the boundary box lid.

6.5.5 Operational and Investigational Samples from Water Treatment Works and Service Reservoirs

6.5.5.1 Operational samples may be taken from water treatment works determine the chemical quality of the water leaving the works and to check that any treatment process is

operating effectively and from service reservoirs (and water towers) to determine the chemical quality and to check for ingress of contamination. Investigational samples may be taken from water treatment works and service reservoirs (and water towers) to assist in determining the cause of non-compliance with a chemical or other parameter in a sample taken from a consumer's tap or as part of the investigation into an incident affecting drinking water quality. Before collecting any samples, any sampling tap must be flushed.

6.5.5.2 Follow the instructions below for sampling from a metal tap at water treatment works or service reservoir.

- Flush water through the tap for 2-3 minutes at a steady rate. For permanently running taps, do not adjust the flow.
- Collect the sample or samples for the relevant parameter or parameters into the appropriate bottles (see appendix 1 for details).
- Ensure that each sample is given a unique identifier and record all relevant information on the bottle label and on the sampling round sheet or sampler's work list.

6.5.5.3 Ideally all service reservoirs (and water towers) should be fitted with metal sampling taps on the outlet pipe from the reservoir or tower. However if they are not, the only way to obtain a sample is by dip sampling. Great care must be taken to ensure that no contamination is caused by the act of dip sampling. This includes clearing any loose material away from hatches before opening, and keeping dippers and bottles scrupulously clean. Special sampling equipment consisting either of a bottle-holder with attached clean chain, rope or string, and with a bottle secured in situ; or a sampling vessel with attached clean chain, rope or string. The dipped sample should be representative of the full depth of water and not taken directly from the surface. Follow the instructions below for taking dip samples from service reservoirs (and water towers).

- If a bottle holder is used, remove the top from the bottle, unwrap the equipment and gradually lower it until it is just **above** the surface of the water. Now release sufficient rope to allow the sample bottle to drop rapidly through the depth of the water and then

steadily haul it back to the surface so the bottle fills as it rises. Lift the bottle carefully from the water and replace the top. This should be carried out away from the access cover to avoid sample/waste falling back into the reservoir. More than one bottle may need to be used depending on the parameters being investigated (see appendix 1).

- Alternatively if a sampling vessel is used, unseal it, lower it into the body of water to collect the sample and withdraw it carefully from the water. Remove the top from the sample bottle and pour the water into the bottle. This should be carried out away from the access cover to avoid sample/waste falling back into the reservoir. More than one bottle may need to be filled depending on the parameter being investigated (see appendix 1).
- Ensure that each sample is given a unique identifier and record all relevant information on the bottle label and on the sampling round sheet or sampler's work list.

6.5.6 Investigational Samples from Consumers' Taps

6.5.6.1 Investigational samples may be taken from consumers' taps to assist in determining the cause of non-compliance with a chemical or other parameter in a sample taken from a consumer's tap or when investigating consumer complaints about drinking water quality.

2.5.6.2 Follow the instructions below for the relevant parameters.

- For lead, copper and nickel, do not flush the tap. Collect the first 1 litre of water that issues from the tap when it is turned on in the appropriate bottle. Further types of sample may be required for lead, copper and nickel; for example a sample taken after fully flushing water stagnant in the service pipe work to waste and a sample taken after the water has been stationary (no use of water) in the service pipe work for a controlled period (such as 30 minutes).
- For all the other parameters, collect the sample or samples into the appropriate bottles (see appendix 1 for details).
- Ensure that each sample is given a unique identifier and record all relevant information on the bottle label

and on the sampling round sheet or sampler's work list.

6.5.7 Operational and Investigational Sampling for Dissolved Metals

6.5.7.1 Operational or investigational samples may be required from any of the above sampling points for dissolved metals (instead of for total metals), particularly for dissolved iron.

6.5.7.2 Follow the procedure below for taking samples for dissolved metals.

- Prepare the tap or other sampling point as described in the sections above including any flushing.
- Remove the plunger from the syringe and attach the 0.45µm filter to the tip, ensuring that the filter is on the right way round.
- Fill the syringe with water from the sampling point, point the end of the filter into the sample bottle and apply enough force to the plunger to create a reasonable flow rate through the filter. If more water is required to fill the sample bottle, remove the plunger and refill the syringe. A new filter should be used for each new part sample to be filtered to avoid contamination.
- Ensure that the sample is given a unique identifier and record all relevant information on a sampling round sheet or sampler's work list.

6.5.8 Storage and Transport

6.5.8.1 Ideally samples for chemical and other parameters should be stored and transported in the dark, even though some samples are collected in dark bottles. Every effort should be made to deliver the samples to the laboratory as quickly as is possible on the same day. If this is not possible they should be delivered the next day.

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APPENDIX A

SAMPLE BOTTLES, PRESERVATION AND STORAGE

<i>1. Parameters to be sampled for compliance with S.I. 439 of 2000 (Drinking water)</i>						
Parameter/ Parameter Group	Bottle Type	Bottle Code	Volume (ml)	Cleaning Procedure	Preservative	Comments
All bottles containing preservatives must not be rinsed before taking samples						
Taste qualitative Odour qualitative	Brown glass	TOql	125/250	Rinse with sample		Bottles used for these parameters only
Taste quantitative Odour quantitative	Brown glass	TOqn	500 or 1000	Rinse with sample	Bottles used for these parameters only	
pH value Colour Turbidity Conductivity Ammonium Nitrate Nitrite Chloride Fluoride Sulphate Boron	Disposable PET food grade or other clean plastic	pH etc	1000	Rinse with sample		Fill bottle completely – no air gap
Aluminium Iron Manganese Barium Cadmium Chromium Sodium	Disposable PET food grade or other clean plastic	Al etc	250 or 500		2.5 ± 0.25 ml or 5.0 ± 0.50 ml of concentrated 'Aristar' nitric acid	Acidified ASAP after receipt in laboratory
Copper Lead Nickel	Disposable PET food grade or other clean plastic	Cu etc	1000		10 ± 1 ml of concentrated 'Aristar' nitric acid	First 1000 ml from tap without any flushing. Acidified ASAP after receipt in laboratory
Arsenic Antimony Selenium	Disposable PET food grade or other clean plastic	As etc	1000		10 ± 1 ml of concentrated 'Aristar' nitric acid	Acidified ASAP after receipt in laboratory
Mercury	Glass with glass stopper	Hg	500	Wash with nitric acid, deionised water rinse	5.0 ± 0.5 ml concentrated 'Aristar' nitric acid	Use only pre- prepared bottles

Parameter/ Parameter Group	Bottle Type	Bottle Code	Volume (ml)	Cleaning Procedure	Preservative	Comments
All bottles containing preservatives must not be rinsed before taking samples						
Cyanide (total)	Centrifuge tube 1 Centrifuge tube 2	CN 1	50 50		Tube 1 - 100 ml of 0.5% ascorbic acid Tube 2 - one pellet sodium hydroxide	Sample into tube 1 and mix. Transfer into tube 2. Tube 2 marked ' corrosive '. Use only pre- prepared tubes.
Total Organic Carbon (TOC) – instead of oxidisability	Glass	TOC	250	Rinse with sample		Fill bottle completely. Bottle used for this parameter only
Bromate	Centrifuge tube	BrO ₃	50		50 µl of 50 mg/l ethylene diamine	Use only pre- prepared tubes. Mark tubes with maximum shelf-life of one month
Trihalomethanes Trichloroethene Tetrachloroethene	Purge and trap amber vials	THMs etc	2 times 40 ml		Sodium thiosulphate crystals	Fill completely – no air gap.
Benzene 1,2-dicloroethane	Purge and trap amber vials	Benz etc	2 times 40 ml		Sodium thiosulphate crystals	Fill completely – no air gap.
Polycyclic aromatic hydrocarbons Benzo(a)pyrene	Brown glass	PAH	1000	Chromic acid wash. Deionised water rinse	1.0 ± 0.1 ml of 20% sodium thiosulphate	Fill completely – no air gap. Extract ASAP. Tap must not be sterilised
Pesticides 1. Organochlorines 2. Organophosphorus 3. Triazines 4. Urons 5. Chlorophenoxy acids	1. Glass 2. Glass 3. Glass 4. Glass 5. Glass	P-OC P-OP P-T P-U P- CPA	1000 500 500 1000 1000	All Chromic acid wash. Deionised water rinse	2. and 3. 1.0 ± 0.1 ml of 20% sodium thiosulphate	All Fill completely – no air gap. Extract ASAP.
Tritium Total indicative dose (gross alpha and gross beta activities)	Disposable PET food grade or other clean plastic	RA	1000			

Parameter/ Parameter Group	Bottle Type	Bottle Code	Volume (ml)	Cleaning Procedure	Preservative	Comments
All bottles containing preservatives must not be rinsed before taking samples						
<i>Escherichia coli</i> Coliform bacteria Colony counts	Pre-sterilised plastic	Coli	350 or 500 ml	Pre - sterilised	Pre-dosed with sodium thiosulphate	Single use disposable plastic bottles. Store and transport in cool conditions
Enterococci	Pre-sterilised plastic	Cocci	350 or 500 ml	Pre - sterilised	Pre-dosed with sodium thiosulphate	
<i>Clostridium perfringens</i> (including spores)	Pre-sterilised plastic	CP	350 or 500 ml	Pre - sterilised	Pre-dosed with sodium thiosulphate	
2. Parameters that may need to be sampled in drinking water for operational purposes (to check the operation of treatment processes and distribution systems, to investigate non-compliances with the mandatory standards and indicator parameter values in S.I. 439 of 2000 and to determine other characteristics of drinking water)						
Hardness Calcium Magnesium Alkalinity Phosphorus Silica	Disposable PET food grade or other clean plastic	Hard	1000	Rinse with sample		Fill completely – no air gap. Phosphorus if plumbosolvency control practised
Potassium Zinc	Disposable PET food grade or other clean plastic	KZn	500		5.0 ± 0.50 ml of concentrated 'Aristar' nitric acid	Acidified ASAP after receipt in laboratory
Geosmin Methylisoborneol Other organics	Glass	Geo	1000 or 2000	Chromic acid wash. Deionised water rinse		
Chlorophyll-A	Disposable PET food grade or other clean plastic	C-A	1000			Filter and extract ASAP in laboratory
Algae	Disposable wide-neck plastic vial	Alg	50			Preserve with 2ml ± 0.2ml Lugols Iodine Solution on receipt.
Dissolved oxygen (record temperature of sample)	Glass with glass stopper	DO	250		1. 2 ml MnSO ₄ , 2. 2 ml alkaline iodide	Part fill slowly, add reagents, fill slowly, stopper and invert to mix
Aeromonads <i>Pseudomonas</i> <i>aeruginosa</i>	Pre-sterilised plastic	Aero	350 or 500	Pre- sterilised	Pre-dosed with sodium thiosulphate	Single use disposable plastic bottles. Store and transport in cool conditions
Salmonella	Pre-sterilised plastic	Salm	350 or 500	Pre- sterilised	Pre-dosed with sodium thiosulphate	

Parameter/ Parameter Group	Bottle Type	Bottle Code	Volume (ml)	Cleaning Procedure	Preservative	Comments
All bottles containing preservatives must not be rinsed before taking samples						
Cryptosporidium	Special cartridge	Crypto				From continuous sampling device. Special technique
Macro-organisms – e.g. ascellus, gammarus etc	57 micron hydrant net	Net	5000+ litres to through net			Flow rate > 1 litre/18 seconds. Keep net wet in plastic bucket

APPENDIX B

AGREED PROTOCOL BETWEEN

**ENVIRONMENTAL HEALTH DEPARTMENT, (MIDLAND AREA),
HEALTH SERVICE EXECUTIVE**

AND

**WATER SERVICES SECTION
OF WESTMEATH COUNTY COUNCIL**

FOR

**MICROBIOLOGICAL AND PHYSIOCHEMICAL EXCEEDENCES
OF PUBLIC AND PRIVATE SOURCED WATER SUPPLIES**

Agreed Procedure for Parametric exceedence in Public Water Supplies between HSE Midland Area & Local Authorities

Unsatisfactory Microbiological Sample

When an unsatisfactory Microbiological result is received, the PEHO/SEHO, sampling EHO shall be informed as soon as possible. The sampling officer/SEHO shall inform the PEHO/SEHO, Co. Council, i.e. Water Services Department shall be informed by fax/e-mail of the result, see appendix 4.

Record of fax/e-mail to be kept.

The sampling officer/S.EHO shall inform the P.EHO/S.EHO.

To decide an appropriate course of action the following will take place.

1. Water Services Department shall instigate enquiry into existing situation and inform E.H.O of same.
2. Follow-up samples will be taken in all cases. The follow up samples are:
 - a) Swab of consumers tap, before disinfection,
 - b) Water sample from consumers tap before disinfection,
 - c) H₂O sample from consumers tap after disinfection,
 - d) H₂O sample from nearest outside tap on the supply zone and,
 - e) H₂O sample from treatment plant
3. Information on type of pipework shall be obtained from the consumer.

This may result in any or all of the following;

- Further sampling/investigation
- Remedial works
- Boil water notice
- Establishment of Water Incident Management Team.
- Discussion with other relevant Departments e.g. Public Health.

Where it is decided to issue boil water notice, the procedure is as follows;

1. The PEHO shall inform by phone the SE/S.E.E. in Water Services Department of recommendation to issue boil notice.
2. This will be confirmed in writing by fax and posted to Water Services Department.
3. This letter will be copied by fax to Public Health & Planning Department, Arden Road, Tullamore (Fax No. 05793 59907) and relevant Senior Medical Officers.

4. Following remedial works being carried out, follow-up sampling will take place along the supply.
5. On receipt of three consecutive clear samples (microbiological/residual chlorine) taken at a minimum 24 hours apart, the P.E.H.O. shall phone S.E./S.E.E. Water Services Department with regard to lifting the boil water notice (The lifting of any boil water notice may be dependant on other factors e.g. Water Services Department Action Plan).
6. This will be confirmed in writing by fax and post to Water Services Department.
7. This letter will be copied by fax to Public Health & Planning Department, Arden Road, Tullamore (Fax No. 05793 59907) and relevant Senior Medical Officers.
8. Where a boil water notice is issued, the Environmental Health Department shall inform food premises, hospitals, child-care facilities and nursing homes in the area affected.

Physio Chemical Contamination

An exceedence occurs where any parameter exceeds the parametric value allowed in the European Communities (Drinking Water) (No. 2) Regulations 2007.

When an exceedence occurs the Environmental Health Department notifies the Water Services Department by telephone, fax and or e-mail, see appendix 4. The sampling officer/SEHO shall inform the PEHO/SEHO to decide on appropriate course of action the following shall take place:

1. County Council shall instigate enquiry into existing situation.
2. EHO shall discuss exceedence with S.E./S.E.E.
3. Information on type of pipework shall be obtained from the consumer.
4. Where exceedence is copper, lead or nickel, repeat samples shall be taken, at another consumers tap in the supply zone, and at an agreed point on the Local Authority pipework in the supply zone.
5. For fluoride exceedence, the non conformance protocol in Code of Practice on the Fluoridation of Drinking Water 2007 shall be used.
6. If turbidity results exceed 1.0 NTU regularly then resamples shall be taken following discussion with S.E./S.E.E.
7. Other Chemical Excedences
Where other chemical exceedence occur the HSE shall advise where there is a potential danger to human health.

8. Where Water Service Dept. issues a Do Not Use notice, a copy shall be sent to Environmental Health Dept.
9. Where a Do Not Use Water notice is issued the Environmental Health Department shall inform food premises, hospitals, child care facilities and nursing homes in the affected area.

Agreed protocol between Environmental Health Department, HSE, Longford/Westmeath and Water Services Section, Westmeath County Council for report of unsatisfactory results of samples taken from Small Private Supplies (<10m³/day) and supplying a public or commercial activity.

- Where unsatisfactory result is received, the EHO department will make contact if possible by phone to the premises of supply advising of result.
- Notification sheet will be sent by email/fax to Local Authority indicating :
Date, Sample point, Result, Type of tap, Premises contacted by phone yes or no,
Comment .
Amended copy sent if additional failures of parameters are received (e.g. Enterococci/Perfringens).
- Local Authority shall correspond with premises and shall copy correspondence to EHO department.
- Where Environmental Health Dept is advised by Local Authority that a boil water notice/do not use notice has been served on the supply, sampling is suspended
- EHO department will only re-sample on request from Local Authority, or where copy of correspondence is received rescinding the served notice.

Repeat Samples

- If follow up result is satisfactory an e-mail stating same and showing result is sent to SEE Water Services and Administration Water Services (morgan.cox@westmeathcoco.ie, ecoyle@westmeathcoco.ie)

Monthly summary shall be forwarded for all samples taken. This includes copies of all results. Repeat results will be shown on coloured paper.