

PUBLIC WATER SUPPLY CHEMICAL SAMPLING PROCEDURES

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Affidavit

Evidence Collected By The Public

1. Chemical Sampling Procedures

1.1 Introduction

Public health is dependent on proper sampling techniques and consequently, sampling must not be taken lightly. Proper sampling requires planning, some knowledge of the analytical methods used, and training . This section is intended to answer most of the questions relating to chemical sampling of Public Water Systems but process changes frequently occur, therefore you should always contact the TNRCC Monitoring Team of the Public Drinking Water Section (PDW), Water Permits and Resource Management Division (WPRMD) at 512/239-6020 for the most recent information. This document has been modified for use by contract sampling personnel so please be aware that references to "region" staff mean TNRCC region staff and some of these references may also apply to contract staff.

1.2 Preparation

Sampling Safety - Preservation Chemicals

Acids of various types are the most common sample preservation materials that may pose a risk or hazard. Preservation chemicals must be handled with care and all appropriate safety procedures followed. You may feel that safety precautions are a burden, however, no amount of compensation can replace an eye or other body part damaged by acid. Material Safety Data Sheets are available wherever chemicals are stored.

It is your responsibility to use appropriate eye, hand, and clothing protection.

1.3 Quality Assurance (QA)/Quality Control (QC)

What is QA/QC?

Quality Assurance (QA) is a function of TNRCC management designed to assure appropriate Quality Control (QC) is consistently practiced by all private citizens and contractor personnel. Essentially, it is an integrated program which involves the planning, control, assessment, and quality improvement that are necessary to ensure a product (in this case, field samples) or a specific service

meets defined standards of quality with a certain level of confidence. From time to time you will be called upon to perform certain activities in this regard.

Explanation of Public Drinking Water QA Sampling:

Each type of sample that is collected for public drinking water must be collected and analyzed according to specific EPA approved and numbered methods. No other methodology is allowed or is applicable for public drinking water sampling. After researching the US EPA approved methods and after discussing this issue with QA officers from certified laboratories in Texas and the US EPA QA representatives from Dallas and Cincinnati, it was determined that most of the approved methods do not require or recommend field QA samples because:

1. Only certain analyte groups have an opportunity to be contaminated during the field collection procedures and
2. Most drinking water sample results are a non-detection, and therefore a field QA sample is moot.

It is for these reason that most QA activities required by the approved methods occur within the laboratory and not in the field.

But where applicable, EPA approved analytical methods generally recognize two types of field QA samples. The **field blank**, also called the “field reagent blank”, is used to determine if method analytes or other interferences have contaminated the sample. **Trip blanks** are used to determine if method analytes or other interferences have contaminated the sample during the transportation and shipping process.

Field contamination is a problem only for a subset of the regulated analytes. Therefore, only methods which are approved for the identification and measurement of analytes that are at risk of being contaminated by analytes in the field environment have requirements for field blanks and trip blanks. The analytes that are at risk of contamination during the field sampling process are included in the VOC and SOC groups. Therefore, no other groups of drinking water samples would require any field QA sampling.

If low level detections occur in these groups in such a way that a field QA problem is suspected, then field reagent blanks and trip blanks are collected at specified frequencies and locations in order to resolve the issue. The QA sampling for any event of this nature is closely coordinated with the QA officer of the certified laboratory that is conducting the analyses.

1.4 Field Analysis And Records

Field Instruments

All field instruments should be calibrated according to the manufacturers instructions prior to field use and documented in a calibration notebook to be kept with the instrument. Operation of field equipment varies depending on the manufacturer. Care must be taken to assure that each instrument is functioning properly.

Field measurements should be made in accordance with equipment manufacturers instructions and at appropriate times and locations so that valid information is obtained.

Sampling Submission Forms

TNRCC recommends that each collector maintain a personal record of every sample collected. **All parts of the submission form must be accurately and legibly completed or the sample will be rejected by the laboratory. If each form is not signed by the sample collector and a water system representative the sample may be invalid.**

A four (4) part sample submission form TNRCC-0351 or the contractor's form is available for your use. The top original copy (white) should be submitted to the laboratory and a copy provided to the water system, the other copies are for the contractor's use.

A good set of personal notes and/or copies of sample submission forms kept in a durable notebook will provide the information you need when the inevitable questions are asked many months after the sampling event has taken place.

1.5 Sample Collection Instructions

A. General Information

These items must be consistently performed in order to assure that valid compliance samples are collected:

1. All appropriate QA/QC procedures must be followed during the sample collection/preservation/shipping process. The sample preservation requirements listed on the following pages are of critical

importance and must be consistently and accurately completed. The sample submission form must be correctly and completely filled out or the laboratory is required by US E.P.A. to reject the sample. The preservation methods must be listed on the form.

2. The **chlorine residual** must be measured at each sample site and recorded on the sample submission form for every sample.
3. **Sample Containers** - Use a separate sample container and submission form for **each** sample collected.

Some sample types (ex., All Minerals, VOC, THM) require more than one container per sample but only one sample submission form is required for each sample. For example, when VOC is selected you must submit 2-40 ml. vials for this group. The laboratory must always be able to associate the submission form with the appropriate sample containers or the sample will be rejected. This requires that each sample container be identified.

Each sample container must be properly identified with at least the following information: PWS name, county, and physical address of sample site, sample type (mineral, metal, ICP, VOC, etc.).

When one quart containers are used, the lab must receive 800 to 1000 ml in each container in order to run the analysis. Fill the container to the neck when collecting regular samples. When collecting composite samples, carefully follow the volume requirements stated in the compositing criteria section.

4. **Supplies** - The 40 ml vials, amber glass bottles, plastic cubitainers, pipettes and other routine supplies are required. Sodium thiosulfate solution and Monochloroacetic acid are not standard items and are obtained from the Public Drinking Water Section. TNRCC will supply these two preservation chemicals to the sample collector. All sample collectors (TNRCC staff as well as contractor staff) are responsible for obtaining and using proper sampling equipment and supplies.

B. Compositing Criteria for Minerals and Metals Samples

Minerals and metals samples are the only samples that may be composited. This means one sample made up of water collected from up to 5 sampling sites. Surface water sources (entry points) cannot be composited but if a surface water source is blended with **all** the ground water sources of a single system then the entry points in that system may be composited. Up to five POE's connected to ground water sources may be composited for minerals and metals analyses as long as they are of similar quality, are from the same public water system and produce water from the same formations.

You can use Total Dissolved Solids (TDS) measurements within a range of about 15% as a field test to establish similarity.

Example: When compositing*, use a 100 ml. bottle to divide the sample volumes equally as follows:

C if 2 sampling points collect 500 ml from each.

C if 3 sampling points collect 300 ml from each.

C if 4 sampling points collect 200 ml from each.

C if 5 sampling points collect 200 ml from each.

*The term "composite" is also used for a radiological sample collected over 4 calendar quarters from the same sampling site. See General Comments, Radiochemical listed below.

C. Collection/Preservation Procedures for Specific Chemical Groups

General Comments:

Asbestos - Entries under the asbestos column (ASB) are meant to indicate those systems that need to be surveyed for asbestos. A "95E" means that an evaluation was due in 1995. The sampler decides, based on the result of the survey and Langlier calculation, if asbestos sampling is required. Asbestos evaluation forms may be obtained from the TNRCC PDW Section Monitoring Team. 512/ 239-6100

Minerals - any time a minerals or a nitrate sample is to be collected, a chlorine residual must be recorded on the Water Analysis submission form in order to assure that the nitrate/nitrite results are valid. If a chlorine residual is present. Use two containers as indicated below but mark the submission form for All

Minerals (Box 1) and Total Nitrate (Box 1B).

Nitrate - Sample schedule entries under the nitrate column (NO₃) mean to collect the sample at the indicated POE for **Total Nitrate** (Box 1B) provided a chlorine residual is present or collect a **Nitrate/Nitrite** sample (Box 1A) if a chlorine residual is not present. If total Nitrate is being collected, mark the submission form as **Total Nitrate (Box 1B)**. The Nitrate/Nitrite box (Box 1A) is to be used only when a specific Nitrate/Nitrite sample is requested or if there is no chlorine residual present (most commonly used for new ground water sources). If Box 1A is marked, the sample must arrive at the lab within 24 hours from the time of collection.

Trihalomethane - Entries under the trihalomethane column (THM) indicate only that the system is involved in THM monitoring program. The total number of samples to be collected is listed. A "Q4" means that a total of 4 samples are to be collected each quarter. An "A1" means that one annual Total Potential THM sample is needed. If you have questions as to the type of samples to be collected (distribution, far reaches, total potential, etc.) or other sampling criteria questions about THMs, please contact the PDW section.

Radiochemical - Entries under the radiochemical column (RAD) indicate that one annual distribution system sample should be collected. This is not a point of entry sample. Water should be collected from some point in the distribution system that representative of the quality of water received by the customers.

Specific Sample Groups:

1. All MINERALS If a free chlorine residual is present then mark Box 1 and Box 1B - 1 qt. and a 100 ml. bottle are required; Plastic; May composite up to 5 POE's; No preservation is required for the 1 qt. but you must add 5 drops of Sulfuric Acid (H₂SO₄) to the 100 ml bottle to produce a pH of 2 and the 100 ml. bottle is iced. Nitrate will be reported with this group. If no chlorine residual is present then mark Box 1 and Box 1A. See item 6 (below) for instructions. When Box 1A is marked, it will cause a Nitrite/Nitrate result to be reported. When Box 1A is marked, the sample must arrive at the lab within 24 hours from the time of collection.

2. ALL METALS (Box 2) - 1 qt. required; Plastic; ice recommended but not required. May composite up to 5 POE's; No acid to be added. Lead will be reported with this group.

General Comments- Metals : Routine analysis for community and nontransient

non-community (NTNC) water systems will require the box called ALL METALS to be checked (submit 1 quart). Transient non-community systems will require only METALS- ICP (submit one quart). Icing is not required for either ICP or All Metals.

3. **METALS-ICP (Box 2A)**- 1 qt. required; Plastic; May composite up to 5 POE's; No acid to be added*.

4. **Requests for Individual IOCs** - Submit 1 qt.; Plastic; One quart is required for any combination of Metals and one quart for any combination of Minerals.

Analysis of individual constituents such as iron, manganese, chloride, etc. may be requested by listing the desired item in the underlined blank space provided in the lower portion of Box 1 or Box 2. That is, when you want only one or two specific metals or minerals to be analyzed, list each analyte in the blank space provided and place a mark in the bracket space provided at the front of the underlined blank space.

5. **TOTAL NITRATE*** (Box 1B) - 100 ml required; Plastic; add 5 drops Sulfuric Acid (H_2SO_4) to achieve a pH of 2; iced. Check chlorine residual first. Record the chlorine level on the form. If a normal chlorine residual is detected, collect a Total Nitrate by marking box 1B on the Submission Form. If no chlorine residual is found, mark box "Box 1A" for Nitrate/Nitrite on the Submission Form. If 1A is selected, the sample must be kept in ice (you may freeze it if convenient) and shipped by overnight service .

Nitrate/Nitrite* (Box 1A): 100ml, plastic, screw cap bottle, (like the bacteriological sample bottle), iced. If you are collecting a Raw water sample or if no chlorine residual exists during a routine sampling event, then you must collect a Nitrate/Nitrite sample and mark Box 1A. Flush the tap well and fill the bottle. No other field preservation is required other than to immediately place the sample on ice or freeze in order to maintain 4^0 C during the entire handling and shipping process. Ship the sample via overnight delivery so that it is received by the lab within 24 hours because the laboratory must analyze the sample within 48 hours of the collection time.

*nitrate samples cannot be composited when collected as an individual sample but can be composited when collected in conjunction with a minerals analysis.

7. **LEAD SAMPLES:** If there is ANY lead source in the test tap(brass or

lead solder) and the test tap is not thoroughly flushed, it is **VERY EASY** to exceed the trigger level that requires a check sample to be collected. If any sample exceeds 0.005 mg/L , then a check sample must be collected by TNRCC staff.

When collecting a routine metals sample please use the following procedures.

A. Collect the metals sample at the entry point test tap (a point where all treatment is completed, but before Distribution.)

B. Flush the test tap for 5 -10 minutes. Check for long pipes leading up to the test tap that will require flushing. Make sure all plumbing leading up to the tap is completely flushed. You want to collect fresh water and avoid any water that may have been stagnating in the plumbing. Presently, we do not believe there are lead contaminated aquifers in Texas. We are attributing any lead hits to contamination from the well plumbing or other piping.

8. **THALLIUM** - is no longer required to be submitted as a separate sample. It will be reported with all the other metals.*

General Comments: **SOC GROUP 1 through 6** No compositing; Iced. Be sure each bottle is identified with a waterproof marker. The labels supplied in each box are **not** waterproof. **For SOC Groups 1, 2 and 3** - Use 1 qt. amber glass bottle with Teflon cap liner. Use disposable dropper and add 60 mg/l sodium thiosulfate to the empty container . (This equates to 27 drops or 1.4 ml of the 60 mg/l stock solution.) Fill the container with water and seal.

9. **SOC Group 4** (Box #7) - Using two 40 ml. vials with closed caps (no hole in top of cap) , partially fill each vial then add 1 ml (using a disposable dropper) of 2.5M Monochloroacetic acid to each vial. This produces a pH of 2. Next (using another disposable dropper) add 1 drop of 60 mg/l Sodium Thiosulfate, then complete filling the vials, seal and shake vigorously. Do not reuse disposable droppers. A little head space is ok. Please note, Teflon lined caps are required.

10. **SOC Group 5** (Box #8) - Use 1 qt. narrow mouth amber glass bottle with Teflon cap liner. Add 40 to 50 mg. (about one half scoop) of sodium sulfite to the empty container. Next fill half the container. Next add 50 to 100 drops (2 to 4 ml.) 6N hydrochloric acid (HCl). The pH is required to be < 2. The amount of HCl may vary from 2 to 6 ml. This amount of acid should produce a pH < 2. Finish filling the container and seal. A little head space is

ok. Note: You should initially check pH at a few systems to assure that you are achieving a range of 1.8 to <2 and then periodically thereafter. Be sure that the sample is collected directly from a sampling tap and that no rubber or plastic hose is attached.

11. **SOC Group 6** - (Box #9) - Use 1 qt. narrow-mouth amber glass bottle with Teflon cap liner; iced. The laboratory has requested that the sampler provide one additional SOC5 sample for every 10 SOC5 samples in a shipment. When one to ten SOC5 samples are present in a shipment you should provide at least one extra SOC5 sample. Collect the extra container of water from any one of the sampling points used for any other SOC5 sample in the shipment and use standard preservation technique. Mark the duplicate SOC5 sample as a “QC Duplicate” sample, in addition to the normal identification data provided on the submission form and container.

12. **ENDOTHAL** (Box #10) - No compositing. No acid. 1 qt. amber glass bottle with Teflon cap liner. Iced.

13. **DIQUAT** (Box #11) - No compositing. 100 mg/l sodium thiosulfate. 6N HCl to pH < 2. Iced. 1 qt. amber salinized glass.

14. **GLYPHOSATE** (Box #12) - No compositing. No acid. Iced. 60 mg/l sodium thiosulfate. 1 qt. glass (dark) with Teflon cap liners.

15. **VOC's** (Box #13) - No compositing. Use two 40 ml. glass vials with open caps (hole in top) and silicon/Teflon septa. Allow No head space. Iced. Add 25 mg of Ascorbic acid (about one fourth scoop) to an empty vial. Next, half fill the vial. Next, add 2 drops of 6N HCL (This should produce a pH < 2.) Complete filling the vial and seal. Agitate liquid to mix reagent. Be sure that the sample is collected directly from a sampling tap and that no rubber or plastic hose is attached.

16. **TRIHALOMETHANE (THM)** (Box #14) - No compositing. Use 40 ml. glass vials with open caps and silicon/Teflon septa. Allow No head space. **These samples are to be collected from the distribution system and are not POE samples.**

Maximum Total Potential THM - Use three vials. Do not ice or refrigerate. Measure disinfectant residual at the selected sampling point. Proceed only if a measurable residual is present. Rinse the vials three times with the water being tested, to remove any Sodium Thiosulfate, then fill the

vials. The third vial will be stored for 7 days in the lab and then tested for disinfectant residual. Absence of a residual will invalidate the sample.

Routine THM - Use two vials. Iced. Add two drops of 60 mg/l Sodium Thiosulfate to an empty vial. Next, fill the vial.

17. **EDB/DBCP** (Box #15) - No compositing. Use Two 40 ml. glass vials with silicon/Teflon liners required. Icing required. Add 3 mg of 60ml/l solution of sodium thiosulfate. (This equates to 13 drops of the 60 mg/l stock solution.) Add 2 drops of 6 N HCl to pH 2. Extraction required within 28 days.

18. **RADIOCHEMICAL** (Box #16) - 1 gal. Plastic. No acid or ice required although ice is not prohibited. These samples are collected from the distribution system as a single "grab" sample or as quarterly composite samples. **This will not be a POE sample until new radiochemical rules are implemented.** Radiochemical samples are collected only from Community type Public Water Systems.

In this case, the term “**composite**” means that a quart of water is collected once each calendar quarter for 4 quarters. The same sampling site is used for each quarter. As each quart is collected it is added to a one gallon container and when the 4 quarterly portions are collected and combined, it is submitted to the lab as one sample. The collection date is the date that the composite sample was completed. You must state on the submission form that the sample is a composite and show the date that the sampling was begun in the upper right corner of the form.

19. **ASBESTOS** (Box #17) - 1 qt. plastic. Iced. The sample will be sent to a special lab and filtration is required at the laboratory within 48 hours of the collection time. Evaluation of the system prior to sampling may be required.

HALOACETIC ACIDS (HAA) (Box 18) - Two 60 ml. amber glass vials - with Teflon lined caps. No compositing. Add 5 or 6 drops of Ammonium Chloride (NH_4Cl). If high chlorine residual is present then additional NH_4Cl may be required. Allow no head space. Iced.

D. Check or Confirmation Samples

Check samples are normally required when a routine sample exceeds the MCL. These samples will be collected by the TNRCC contract sample

collectors and billed to the PWS. If quarterly samples are required, they will be billed to the PWS and collected by the contract sample collectors.

Samples that are collected as part of investigative enforcement activities or as the result of a complaint are considered special request samples. The decision to collect samples of this type is usually made by the TNRCC Region Office and they are collected by Region staff.

1.6 Chain Of Custody Procedure

Procedures for Chain of Custody (COC) require maintenance of permanent records for all sample handling and shipment. Chain of Custody procedures must be used to ensure sample integrity as well as legal and technically defensible data.

Any samples collected must be submitted with a Chain of Custody (COC) form and a signed affidavit. The lab has stated that one COC form per shipping container (ice chest) is sufficient. This means that the contract shipper will need to sign only one COC form. The COC form must have each analysis request checked and show a range of collection times.

The sample should be kept in view or in locked storage until custody is relinquished to the shipper and formal documentation of the transfer is completed. The person collecting a sample will start the chain of custody procedure. Use TNRCC form 10065 for COC and write “Drinking Water” at the top of the form.

In completing the tag, care should be taken to insure that all necessary information is correct and legibly written on the tag with a black waterproof ink pen. The use of a fine point pen is discouraged because of possible problems in making legible photostatic copies.

1.7 Shipping Of Samples

The contractor is responsible for shipment of all routine samples to the laboratories so that analyses can be conducted in accordance with US EPA methods. Each sample **must** be accompanied by a sample submission form.

When a sample is shipped to the laboratory, it must be packaged in a proper shipping container to avoid leakage and/or breakage. The laboratory must be able to associate each container in the ice chest with a sample submission form. Sample Submission forms or other documents should be shipped inside the ice chest and must be placed in a plastic bag to prevent water damage. A good method is to use a zip-lock bag taped to the inside of the ice chest lid. All shipping boxes must be taped closed with shipping tape, strapping tape or fiber plastic tape, etc.

The COC form must be signed by the shipper. Therefore, placing the form on the outside of the container is preferable. The envelope containing the Submission Forms and the COC form should be well attached to the container to prevent loss during shipment. If any forms are lost, all samples may be rejected by the laboratory. Placing the forms securely on the outside of the shipping container will allow the shipper to sign the form and immediately take the container rather than being required to wait around for the ice chest to be sealed.

The complete address of the sender and the receiving laboratory must legibly appear on each container. When sent by U.S. Mail, register the package with a return receipt requested. When sent by a shipping service, obtain a copy of the bill of lading. Post office receipts and bills of lading may be used as part of the Chain of Custody documentation.

Certified laboratories must conduct analyses within the prescribed holding times in order to produce valid compliance results. An even flow of samples must be maintained into the labs throughout each sampling period so as to assure that the laboratory capacity is not exceeded. This will require that the Contractor and each shipper carefully plan and coordinate the collection and shipment of samples. Samples must be shipped on a routine daily basis.

It is far better to spend extra funds on ice and shipping costs than to have an entire shipment of samples rejected at the lab because of the failure to meet temperature requirements due to ice melt.

1.8 Sampling New Water Sources

1. Scheduling - After plans to construct the facility are approved, the region receives a copy of the Plan may be contacted by the PWS to initiate the process for collecting RAW water baseline samples to assure compliance with Drinking Water Standards. This type of sampling may be conducted by the

contract sample collectors. If the Region office receives the request from the PWS, they should contact the PDWS Monitoring Team to schedule the sampling event. Because of contract and billing requirements, all scheduling must be done through the PDWS Monitoring Team and no requests should be made directly to the contract sample collector. People requesting analyses for new source water samples should be strongly encouraged to utilize a private lab as described in the Public Well Completion Data Check List because it may take up to 60 days to obtain results through the contract sample collection process.

Routine Baseline Samples: For community PWSs - All Minerals, All Metals, Radiochemical, VOC and Nitrate/Nitrite. For nontransient Non-community PWSs - All Minerals, All Metals, and Nitrate/Nitrite. For Transient Non-community PWSs - All Minerals, ICP Metals and Nitrate/Nitrite. Upon receipt and review of RAW water sample results, Plan Review notifies the region and the Public Water system that the new source is either approved or not approved for use.

A. If a primary MCL exceedance is found to exist, the water source will not be approved for use unless continuous treatment or blending is employed by the PWS to bring the water quality into compliance.

B. If a secondary MCL violation is found to exist, the PWS staff must investigate the situation and determine if treatment or blending can feasibly be used to bring the water into compliance. Permission for use cannot be granted until this process is completed.

In either case (A or B) the PWS must obtain written permission from TNRCC before the water can be used as a PWS source.

4. Upon receipt of the official RAW water analysis report that contains no MCL exceedance, PDW sends a final approval letter to the PWS.

5. Letters will be sent only for results that are marked RAW or indicated as initial samples.

1.9 Constituent Groups

1. MINERALS

CALCIUM
CARBONATE
CHLORIDE
DIL. CONDUCTANCE
FLUORIDE

MAGNESIUM

NITRATE

NITRITE

P ALKALINITY

pH

SODIUM

SULFATE

TDS

TOTAL ALKALINITY

TOTAL HARDNESS

1A NITRATE/NITRITE

2. AND 2A METALS

ICP SCREEN:

ALUMINUM

BARIUM

BERYLLIUM

CHROMIUM

COPPER

IRON

LEAD

MANGANESE

NICKEL

SILVER

ZINC

OTHER METALS:

ANTIMONY

ARSENIC

CADMIUM

MERCURY

SELENIUM

SODIUM

4. SOC GROUP 1 (505/508)

INSECTICIDES

ALACHLOR

ATRAZINE

CHLORDANE

ENDRIN

HEPTACHLOR

HEPTACHLOR EPOXIDE

HEXACHLOROBENZENE

HEXACHLOROCYCLOPEN

TADIEN

LINDANE

METHOXYCHLOR

PCB'S

SIMAZINE

TOXAPHENE

UNREGULATED:

ALDRIN

BUTACHLOR

DIELDRIN

METOLACHLOR

METRIBUZIN

PROPACHLOR

5. SOC GROUP 2 (507)

ALACHLOR

ATRAZINE

SIMAZINE

UNREGULATED:

BUTACHLOR

METOLACHLOR

METRIBUZIN

PROPACHLOR

6. SOC GROUP 3 (515)

Herbicides

2,4-D

2,4,5-TP (SILVEX)

DALAPON

DINOSEB

PENTACHLOROPHENOL

(PCP)

PICLORAM

UNREGULATED:

DICAMBA

7. SOC GROUP 4 (531)

CARBAMATES

ALDICARB

ALDICARB SULFONE

ALDICARB SULFOXIDE

CARBOFURAN

OXAMYL

UNREGULATED:

CARBARYL

HYDROXYCARBOFURAN

METHOMYL

8. SOC GROUP 5 (525)

ALACHLOR

ATRAZINE

BENZO(A)PYRENE

CHLORDANE

DI(ETHYLHEXYL)-

ADIPATE

DI(ETHYLHEXYL)-

PHTHALATE

ENDRIN

HEPTACHLOR

HEPTACHLOR EPOXIDE

HEXACHLOROBENZENE

HEXACHLOROCYCLOP

ENTADIE

LINDANE

METHOXYCHLOR

PCB'S

SOC Group 5 (cont.)

PENTACHLOROPHENOL

(PCP)

SIMAZINE

UNREGULATED

ALDRIN

BUTACHLOR

DIELDRIN

METOLACHLOR

METRIBUZIN

PROPACHLOR

9. SOC GROUP 6 (508A)

PCB'S

10. ENDOTHAL (548)

11. DIQUAT (549)

12. GLYPHOSATE (547)

13. VOC'S (502)

REGULATED

VINYL CHLORIDE

TRANS-1,2-

DICHLOROETHENE

1,1,1-TRICHLOROETHANE

CARBON TETRACHLORIDE

BENZENE

1,2-DICHLOROETHANE

1,2-DICHLOROPROPANE

CIS-1,3-DICHLOROPROPENE

TOLUENE

1,1,2-TRICHLOROETHANE

CHLOROETHANE

ETHYLBENZENE

TOTAL XYLENES

STYRENE

TETRACHLOROETHENE

1,2,4-TRICHLOROETHANE

14. TRIHALOMETHANE

(524)

BROMOFORM

BROMODICHLOROMETHA

NE

CHLOROFORM

DIBROMOCHLOROMETHA

NE

15. EDB/DBCP (504)

16. RADIOCHEMICALS

COMBINED RADIUM 226

AND 228

GROSS ALPHA
PARTICLE
ACTIVITY

17. Asbestos

**18. Haloacetic Acids
(552.2)**

Monochloroacetic Acid

Dichloroacetic Acid

Trichloroacetic Acid

Monobromoacetic Acid

Dibromoacetic Acid

1.10 Routine Sampling of Transient Non-Community (TNC) Public Water Systems

Federal and state standards require that all new sources of water meet minimum chemical quality standards if it is to be used as a public supply. The Public Drinking Water Section (PDW) will require baseline samples for each new water source located at a TNC system.

It is understood that most chemical mineral and metal constituents associated with drinking water are naturally occurring and that the quality of ground water will shift only very slowly over a period of years but changes can and do occur.

2. Microbiological Sampling

2.1 Introduction

This section includes specific information on the proper procedures for collecting and submitting bacteriological samples for coliform analysis. This section also contains the instructions for collecting a filter sample that can be used to determine if a ground water source is under the direct influence of surface water.

2.2 Water Sampling For Coliform Organisms

Routine bacteriological samples are tested for the presence of coliform organisms. This section includes the essential steps of a good sampling procedure. Please note, coliform is an indicator organism only and is not considered a pathogenic (disease causing) bacteria.

2.3 Why Take Water Samples?

You do not want the water you use for drinking, cooking, or washing dishes to be contaminated with microorganisms that cause disease. Unsafe water can spread

a number of diseases that are known as "waterborne illnesses" and include such diseases as typhoid, cholera, and dysentery. All of these illnesses are intestinal disorders caused by microorganisms from the bodies of infected people who may not necessarily appear sick. Water supplies can be contaminated when the feces (bodily wastes) from these infected individuals is not properly disposed of, and instead seeps into underground water or runs off into nearby surface water supplies.

Unfortunately, disease causing microorganisms are very hard to detect in water samples. However, coliform bacteria is very easy to detect in a water sample. "Coliforms" are a group of microorganisms that are found everywhere throughout the environment. Their presence in a water sample may indicate that a direct path exists between the environment and the protected water distribution system. This path could also allow pathogenic organisms into the water supply and is the basis of our concern. All bacteriological samples are first tested for the presence of "Total" coliforms.

One small subgroup of coliform bacteria, fecal coliform, is found only in the lower intestinal tract of man and other warm-blooded animals. Millions of these fecal coliforms are expelled each time a person or animal defecates. When fecal coliform organisms are found in the water sample, they indicate that feces may have contaminated the water and that immediate action must be initiated to find the source of contamination. Most laboratories are now using a test procedure which will indicate the presence of total coliforms and E. Coli.

2.4 How to collect a water sample.

1. You must use a sample container provided by a Texas Department of Health (TDH) approved laboratory. Contact the Public Drinking water Section of the Water Permits & Resource Management Division at (512) 239-6020 to obtain a list of approved laboratories.

2. You should find a proper location to take the sample.

C An outside faucet that does not leak is preferable (avoid rubber hoses, fire hydrants, dirty areas and area behind bushes).

C Do not use the kitchen or bathroom sinks.

C Avoid sampling on extremely windy days or when it is raining.

C Open the sampling faucet to full flow for several minutes to clear the line. Check and record the chlorine residual at this time. Turn off the water and

use a propane torch or bleach and water solution to disinfect around the threads and outlet of the faucet. Follow any disinfection by another flush.

- C Then, reduce the flow to a slow steady stream with no spraying.
- 3. Sample carefully. Please remember, the most important action here is the collection of a representative sample from the water supply.
- C Samples are extremely easy to contaminate! Your hands should be washed just before sampling and dried with a clean towel.
- C Select a sample container from your protected storage container. Samples may be contaminated because the sample container was not stored properly.
- C Carefully open the sample container and **do not** rinse it out. The sample bottle contains a small amount of sodium thiosulfate to neutralize chlorine in the water.
- C Hold the sample container lid so that the inside faces down!
- C Don't touch the inside of the container!
- C Carefully fill the container to the fill line without splashing.
- C Seal the container.
- C The last step is to shut off the water.
- 4. Complete the sample submission form. Follow the instructions listed below. Refer to Figure 6.12.2.2 - 1 for a copy of form G-19.
- A. Public water supply systems fill in the following information:
 - C Correct Public Water Supply I.D. number.
 - C Name of system.
 - C Point of collection (be specific and indicate sample site number if applicable).
 - C County name.

- C Disregard spaces for submitter I.D. number, unless required by the local approved laboratory.
- C Name and mailing address in area designated as "Send Results To:".
- C Date and time of sample collection. Include initials of person who collected sample.
- C For "Type of System" check "Public".
- C For "Sample is" check "Distribution" if it is a routine sample. Check only one box in this area. "Repeat" samples are collected immediately following notification that a previous routine "Distribution" sample contained coliform organisms. "Raw", "Construction", and "Special" samples are not part of the routine bacteriological monitoring program.
- C Check the appropriate selection under "Water source". Record the chlorine residual in the appropriate blank. The chlorine residual should have been determined while flushing the faucet, before sampling.
- C If you have questions about the form, contact the Public Drinking Water Section in Austin at (512) 239-6020.

WATER BACTERIOLOGY
Form No. G-19

Texas Department of Health
Bureau of Laboratories

Date and Time Rec'd.

Date

Sample No.

Reported

Do not mark above this line - Please print with ballpoint pen or typewriter.

Water System I.D. No.	Name of Water System

POINT OF COLLECTION	COUNTY

Submitter I.D. No.

SEND NAME

RESULTS STREET ADDRESS (P.O. Box)

TO: CITY x ZIP CODE

Date and Time of Collection										
	MONTH	DAY	YEAR	TIME	AM/PM	COLLECTED BY				

TYPE OF SYSTEM		SAMPLE IS <small>(Public Systems Only)</small>		WATER SOURCE	
<input type="checkbox"/> Public	<input type="checkbox"/> Dairy	<input type="checkbox"/> Distribution	<input type="checkbox"/> Raw	<input type="checkbox"/> River	<input type="checkbox"/> Lake
<input type="checkbox"/> Individual	<input type="checkbox"/> Bottled	<input type="checkbox"/> Construction	<input type="checkbox"/> Repeat	<input type="checkbox"/> Well	<input type="checkbox"/> Well Depth <u> </u>
<input type="checkbox"/> School	<input type="checkbox"/> Special	Chlorine Residual <u> </u>			
Ownership or other information					

LABORATORY REPORT (Do not write below)

Water of satisfactory bacteriological quality must be free from Coliform organisms

Coliform Organisms Not Found
 Found

Total coliform group
 Escherichia coli
 Repeat samples required

UNSUITABLE FOR ANALYSIS - PLEASE RESUBMIT

- | | |
|--|---|
| <p>3. Sample too old. Sample not received within 30 hours of collection</p> <p>4. Date discrepancy or form incomplete (See encircled item)</p> <p>5. Leaked in transit</p> <p>6. Other</p> | <p>7. Quantity insufficient for analysis (100 ml. required)</p> <p>8. Heavy (silt/bacterial growth) present, possibly compromising test results</p> |
|--|---|

Figure 6.12.2.2 - 1. TDH Water Bacteriological Form No. G-19.

- B. For individual well owners - complete **only** the following items:
 - C For the "Name of Water System " write in "private."
 - C Fill in county name.
 - C Fill in the well owners name and mailing address in the area designated as "Send Results To."
 - 1. Fill in date, time and the initials of the person who collected the sample.
 - C For "Type of System" check "Individual."
 - C Then, complete as much information as is known under "Water Source."
 - C. Follow these steps to prepare the sample for delivery to the lab:
 - C Carefully prepare the sample for shipment. Leaking samples cannot be accepted.
 - C The sample must arrive at an approved lab within **30 hours** from the time it was collected.
 - C Mail or deliver the sample to the nearest approved lab.
 - 5. How many samples to take.

Public water supply systems serving 1,000 or fewer people must submit at least one sample per month. Public water supply systems serving more than 1,000 people should contact the Public Drinking Water Section of the Water Permits & Resource Management Division at the Texas Natural Resource Conservation Commission. The Public Drinking Water Section can be contacted in Austin at (512) 239-6020 for information about bacteriological sampling and the required number of monthly samples.
 - 6. Know what to expect
 - C Results will be mailed to you after completion of the test(s).
 - C The words which are the key to this report are:

___ Coliform Organisms **Found**
___ Coliform Organisms **Not Found**

- C A **positive** which indicates fecal coliform or E. Coli found means that immediate action should be taken to find the source of the contamination. The well should be disinfected with chlorine. Contact the Public Drinking Water Section for assistance.
- C A **positive** or "total coliform organisms found" report indicates that coliform organisms were present in the water sample and that there may be a concern regarding the sanitary quality of the water.
- C A **negative** or "coliform organisms not found" report indicates that coliform organisms were not present in the water sample and that the water was considered bacteriologically safe to drink at the time of sampling. The individual result for public water supply systems is not as important as a "history" of good results.
- C Note: Please remember that other factors, such as chemical composition or chemical contamination, may also affect the safety of the water.
- 7. What to do if sample report says "Coliform Organisms Found."
- C **Private well owners** should contact the closest office of the Texas Natural Resource Conservation Commission for information about disinfecting the well or obtaining continuous disinfection equipment. For information and assistance with this call the Consumer Assistance Hotline of the Utilities and Districts Section in Austin at (512) 239-6100.
- C **Public water supply systems** must submit repeat samples immediately and check the *Drinking Water Standards Governing Drinking Water Quality and Reporting Requirements for Public Water Supply Systems*. The system may be in violation of State Law, and may need to provide a public notice concerning these sample results to its customers. Questions can be directed to the Public Drinking Water Section in Austin at (512) 239-6020.
- 8. What to do if sample report says "Unsuitable for Analysis."

This means that the lab was unable to conduct a valid test and no conclusive results were obtained. Public water supply systems must

resubmit the sample and private well owners may wish to investigate well disinfection before resubmitting a sample.

9. Conclusions.

Follow the proper procedure for testing! Your sample must be collected in a sterile container that is provided by an approved laboratory and every precaution must be taken to avoid contamination. Otherwise, the results of the lab analysis are without value and your drinking water may be **unsafe!**

Guidelines and regulations concerning water sampling for public water supplies are set out in the Texas Natural Resource Conservation Commission's *Drinking Water Standards Governing Drinking Water Quality and Reporting Requirements for Public Water Supply Systems*, 30 TAC 290.101 - 290.119, and the Federal *Safe Drinking Water Act* which is administered by the U.S. Environmental Protection Agency.