

Environmental Laboratories

[Introduction](#)

[Aquatic Biology Overview](#)

[Organic Chemistry Overview](#)

[Inorganic Chemistry Overview](#)

[Radiochemistry Overview](#)

[Sample Submittal](#)

Chain of Custody and Supplemental Information

[Organic Analysis – Base/Neutral/Acid Extractables](#)

[Organic Analysis – Volatiles and Petroleum Hydrocarbons](#)

Inorganic Analysis

Chart VI-1, [Environmental Microbiology Tests](#)

Chart VI-2, [Ambient Parameters: Tests, Containers and Holding Times](#)

Chart VI-3, [General Inorganics: Tests, Containers and Holding Times](#)

Chart VI-4, [Metals: Tests, Containers and Holding Times](#)

Chart VI-5, [Inorganic Analysis: Bottles and Preservatives](#)

Safe Drinking Water Parameters

Chart VI-6, [Safe Drinking Water Parameters – Inorganics](#)

Chart VI-7, [Inorganic Analysis: Bottles and Preservatives](#)

[Aquatic Biology \(Biological Analysis\)](#)

[Radiochemical Analysis – Instructions for Completing Request Sheet](#)

[Asbestos Analysis](#)



Environmental Laboratories

(615) 262-6341

Introduction

The Environmental Laboratories provide quality analytical support to the Department of Environment and Conservation's (TDEC) Environmental Regulatory Divisions: Air Pollution Control, Radiological Health, DOE Oversight Division, Underground Storage Tanks, Drinking Water Supply, Water Pollution Control, Remediation, Groundwater Protection and Solid Waste Management. Other state departments that are served on a more limited basis include the Office of the Attorney General and the Departments of Agriculture, Corrections, Finance and Administration, Health, Labor, Tourism, Tennessee Wildlife Resource Agency and Transportation.

The Environmental Laboratories provide timely, reliable and economical analytical work by maintaining a well-trained staff and state of the art instrumentation and by using Environmental Protection Agency (EPA) approved methodologies. The results generated by the Environmental Laboratories are used in administrative decision-making processes, permit monitoring, enforcement actions, clean-up programs and criminal investigations.

All samples submitted for analysis should be properly collected in bottles furnished and prepared by the Environmental Laboratories. Proper collection and preservation steps must be taken to assure quality data. Consult with the nearest Environmental Laboratory (Jackson, Knoxville, or Nashville) for more information.



Aquatic Biology

The Aquatic Biology Section performs biological analyses to determine the impact of pollution on Tennessee's waterways. The functional scope of the section requires coordination with other state and federal agencies to accomplish common goals. The schedule of duties is largely determined by the TDEC Division of Water Pollution Control and other agencies that require water pollution related biological data. These analyses include:

- Stream surveys of fish and macroinvertebrate communities using quantitative and qualitative methods to ascertain the impacts of instream pollution.
- Collection and analyses of fish flesh for toxic chemical residues.
- Chlorophyll analysis for determining the effects of pollutants, such as acid rain, on the primary productivity of streams.
- Toxicity testing of industrial and municipal effluents in support of the National Pollution Discharge Elimination System.
- Toxicity tests in circumstances where contaminants are suspect in any body of water.

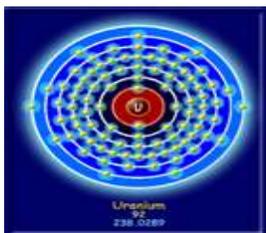
Laboratory cultured populations of the waterflea, *Ceriodaphnia dubia* and the fathead minnow, *Pimephales promelas*, are used in the performance of acute and chronic toxicity tests.

Organic Chemistry



The Organic Analysis Section uses sophisticated instrumentation to detect hundreds of pollutants in the parts-per-billion range. Many types of samples from all over the state are analyzed in support of state and federal environmental regulations, such as the Safe Drinking Water Act, the Resource Conservation and Recovery Act, Underground Storage Tank rules, permitting activities and well-head protection. The four units that comprise the Organic Analysis Section are the:

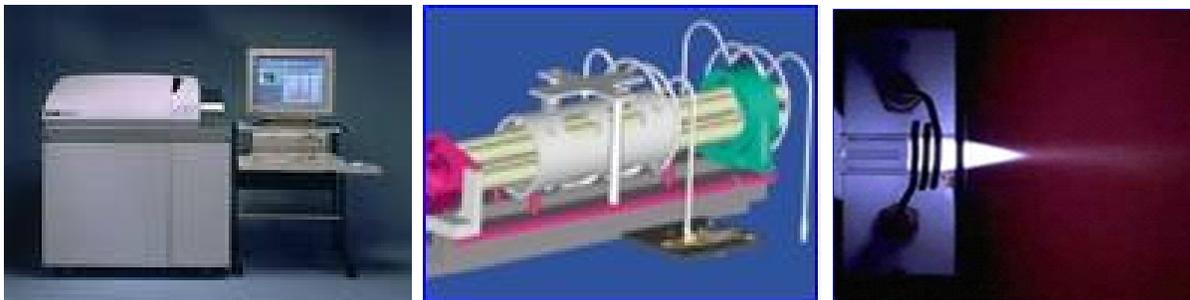
- Volatiles and Underground Storage Tanks (VOA & UST) Analysis Unit: The VOA subunit tests for common drinking water contaminants and many industrial solvents in samples submitted from landfills and Superfund sites, whereas UST subunit examines water and sediments for gasoline and diesel fuel as well as components of petroleum fuels such as the carcinogen benzene.
- Extractable Analysis Unit does sample preparation by extracting all base/neutral/acid pollutants and analyses for pollutants such as pesticides, herbicides, plasticizers and coal-tar derivatives that may be found in drinking water, wastewater, soils, wastes and fish tissues.



Inorganic Chemistry

The Inorganic Chemistry Section, comprised of the General Inorganics and Metals Units, analyses various matrices for inorganic characteristics and contaminants affecting environmental quality. Samples tested most commonly are water, sediment and air filters but can include fish tissue and paint chips.

- The General Inorganics unit performs a wide variety of analytical techniques including traditional wet bench chemistry, gravimetry, colorimetry and UV/Visible spectrometry. Analyses include BOD, COD, cyanide, total phenol, nitrogen analysis, total phosphate, pH, fluoride, flashpoint, hardness, acidity and alkalinity, oil and grease, solids and PM_{2.5} filter analysis.
- The Metals Unit employs atomic absorption and atomic emission spectroscopy for the analysis for metals. Atomic absorption includes flame, graphite furnace and cold vapor techniques. Atomic emission is performed by inductively coupled plasma (ICP). A broad range of metals can be detected by these methods, including arsenic, cadmium, lead, chromium, copper, nickel and iron.
- Asbestos is a separate analytical unit located in the Knoxville Branch Laboratory. Microscopic analysis of sample material is performed to determine type and percent of asbestos fibers in materials such as pipe insulation, roofing material, or floor tiles.



Radiochemistry

The Radiochemistry Laboratory is a section within the Environmental Chemistry Division of Laboratory Services. The primary function of the Radiochemistry Laboratory is the analysis of environmental samples for the presence of low levels of radionuclides. By definition, the Radiochemistry Laboratory is a low level radiation laboratory. In other words, the majority of samples received have levels of radiation that are just at or below normal environmental levels.

- The Radiochemistry Laboratory receives environmental monitoring samples from Sequoyah Nuclear Plant, Watts Bar Nuclear Plant, Nuclear Fuel Services and large radioactive material license holders. In addition, there are numerous environmental monitoring programs both on and off the Oak Ridge Reservation that generate a large number of samples requiring analysis for radiochemical parameters as well as other inorganic and organic parameters.
- The Radiochemistry Laboratory tests a wide variety of sample matrices, such as water, milk, soil, sediment, vegetation, fish, sludge and air filters. All sample matrices are analyzed for alpha, beta and/or gamma radiation.
- Numerous analytical techniques are used to prepare samples for analysis. These include ashing, acid digestion, precipitation, distillation, centrifugation and ion exchange chromatography.
- The Radiochemistry Laboratory employs sophisticated radioanalytical instrumentation in the analysis of environmental samples. For alpha and beta analysis, the Laboratory has three low-background gas proportional gross alpha-gross beta counters. For gamma analysis, the Laboratory has two low-background high purity germanium detectors coupled with contemporary software and electronics. For liquid scintillation analysis, the Laboratory has a liquid scintillation counter with ultra-low background and alpha-beta discrimination options.



Sample Submittal

The State of Tennessee's Environmental Laboratory is a professional environmental team in partnership with Tennessee's Department of Environment and Conservation and other state agencies. This partnership is dedicated to protecting and improving the environmental health of Tennessee's' citizens. Our role is to provide scientific information and cost-effective, accurate and precise analytical support with integrity and to assist other laboratories in providing the highest quality service available.

General Information

- **Only authorized personnel of the environmental regulatory agencies in the Department of Environment and Conservation and other state agencies contracted with the Environmental Laboratories may submit samples.**
- Use the proper sample containers. These may be obtained from your nearest State of Tennessee Environmental Laboratory.
- Observe preservation requirements as outlined in Chart **VI - 5**, INORGANIC ANALYSIS: BOTTLES AND PRESERVATIVES, page **VI - 18**. Ice all samples.
- When sampling, remember that preserved bottles contain hazardous reagents. Material Safety Date Sheets (MSDSs) are available at the laboratory for your use.
- The forms are printed on **No Carbon Required (NCR) paper**. The sampler will keep the yellow copy when the sample is brought to the laboratory.
- The chain of custody information, the sample identification information and the analyte checklist are on one side of the sheet.
- The analyte checklists on each sheet are organized according to analytical methodology or regulatory program interests.
- The request sheets are not report sheets (except for the Biological Analysis sheet), therefore results will not be reported on these sheets.

The following Environmental Sample Request Sheets are available:

- Organic Analysis -- Base/Neutral/Acid Extractables
- Organic Analysis -- Volatiles and Petroleum Hydrocarbons
- Inorganic Analysis
- Safe Drinking Water Parameters – includes both organic and inorganic parameters
- Radiochemical Analysis
- Biological Analysis

Sample Identification Information (continued)

Instructions for Completing Environmental Sample Request Sheets

Organic Analysis -- Base/Neutral/Acid Extractables
Organic Analysis -- Volatiles and Petroleum Hydrocarbons
Inorganic Analysis
Safe Drinking Water Parameters

See page VI - 24 for Biological Analysis Sample Request Sheets and page VI - 28 for Radiochemical Analysis Sample Request Sheets.

Sample Identification Information

The information is located in the upper left-hand shaded box. It must be filled out completely by the sampler.

1. **Project/Site No.:** The unique number that is designated by the program area/sampling agency. This does not need to be filled out if there is no project or site number associated with the sample.
2. **Project Name:** The designated name for the project number entered in Project/Site No. above. The project name should be the focus of the field investigation. (For example, EZ Leak Industry has had an industrial spill and several residential wells are sampled to determine the extent of contamination. The project name will be EZ Leak.) It is also used for sites with no project number that is part of a larger investigation.
3. **Station Number:** The field number assigned by the sampler that uniquely identifies the point at which the sample was taken. (For example W1.)
4. **County:** Designated by the two-digit county code used by state agencies.
5. **Description:** A complete description of the location at which the sample was taken. (For example D. C. Smith residence for the EZ Leak Project in 2 above. Other description examples are Dirty Creek 500 yds upstream of industry Q or @ Industry Q waste pit #1.)
6. **Stream Mile:** The stream mile of a navigable river or stream.
7. **Depth:** May be the depth sampled for a core sample of soil or the depth at which a water sample was collected in a well or body of water.
8. **Matrix:** The sample type. (For example water, sediment, or industrial waste.)
9. **Collection Date:** The date the sample was collected.
10. **Time:** The time that the sample was collected in military time (24-hour clock time).
11. **Sampler's Name:** Include the first and last name **printed legibly**.
12. **Sampling Agency:** The agency for which the sample was collected. (For example UST or WPC.)
13. **Billing Code:** The TDEC billing code and cost center for purchase of laboratory services assigned to the various TDEC programs to which the analyses performed on a sample are billed. (For example 327.41-08 or 327.34-21.)

Sample Identification Information (continued)

14. **If Priority, Date Needed:** Must be filled out if the analytical results are needed by a particular date as determined by health effect emergency or program-determined priority. ASAP is never appropriate.
15. **Send Report To:** The person's name and complete address where the sample report should be sent.
16. **Contact Hazard:** A listing of any known hazards related to the sample (radiological, chemical, or biological). Do not put "none". Write "unknown" if you are not aware of a hazard. (For example hydrocarbon -- strong odor, organic solvents, pure gasoline, or poison ivy.)

**Figure VI - 1
 Sample Identification Information**

State of Tennessee -- Environmental Laboratories
 PLEASE PRINT LEGIBLY



PROJECT/SITE NO. 3-19022	PROJECT NAME EZ LEAK
STATION NUMBER W1	COUNTY 19
DESCRIPTION D C Smith Residence	
STREAM MILE --	DEPTH --
MATRIX WATER	
COLLECTED: DATE 3/28/01	TIME 0815
SAMPLER'S NAME (PRINTED) M N FIELD	
SAMPLING AGENCY UST	BILLING CODE 327.41-08
IF PRIORITY, DATE NEEDED 4/4/01	
SEND REPORT TO: M N FIELD, UST	
NASH BASIN OFFICE	
CONTACT HAZARD Possible hydrocarbon -- strong odor	

Chain of Custody and Supplemental Information



Chain of Custody and Supplemental Information

Chain of custody is required by the TDEC Office of General Counsel for samples that have the potential of being used in court, reviewed by state boards, or involved in state hearings. This entire area must be filled out completely to meet chain of custody requirements. Several program areas (UST, SWM, DSF) have mandated that chain of custody be filled out on all samples

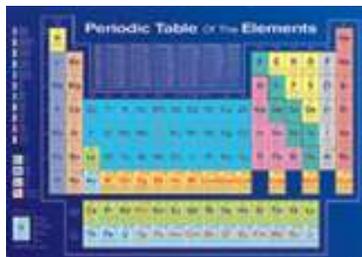
1. The sampler signs his(her) name in full in the **Collected By** space with the date and military time (24-hour clock time).
2. If the sampler gives the sample to anyone else before it is delivered to the laboratory, each person responsible for the sample must sign their full name on the **Received By** space with the date and military time. The person in the laboratory who receives the sample will sign line 4.
3. Completely fill out all the information under **Additional Information** including:
 1. Approximate volume of sample
 2. Nearest town or city
 3. Others present at collection
 4. Number of other samples collected at the same time at this point
 5. Field collection procedure, handling and/or preservation of this sample (can write SOP if a written SOP was followed)
 6. Mode of transportation to the laboratory (state vehicle, bus, UPS, etc.)
 7. Sample/cooler sealed by
 8. Date sample/cooler sealed
 9. Remarks

Chain of Custody and Supplemental Information (Continued)

Figure VI - 2
Chain of Custody and Supplemental Information

Only one chain of custody form is required per sample set or point (if all collected at the same time)

1.	Collected by <i>Mary N. Field</i>	
	Date <i>3/28/01</i>	Time <i>0815</i>
	Delivered to <i>Bob Smith</i>	
	Date <i>3/28/01</i>	Time <i>1300</i>
2.	Received by <i>Bob Smith</i>	
	Date	Time
	Delivered to <i>Lab</i>	
	Date	Time
3.	Received by	
	Date	Time
	Delivered to	
	Date	Time
4.	Received in Lab by <i>Leo Barriociere</i>	
	Date <i>3/29/01</i>	Time <i>0920</i>
	Logged in by <i>Leo Barriociere</i>	
	Date <i>3/29/01</i>	Time <i>1000</i>
Additional information		
1.	Approximate volume of sample	
		<i>4 Liters</i>
2.	Nearest town or city <i>Joelton</i>	
3.	Others present at collection <i>Charles, Jones, EZ leak</i>	
4.	Number of other samples collected at same time at this point	<i>4</i>
5.	Filed collection procedure, handling and/or preservation of this sample	<i>Acc to SOP</i>
6.	Mode of transportation to lab	<i>State vehicle</i>
7.	Sample sealed by <i>M N Field</i>	
8.	Date sample sealed <i>3/28/01</i>	
9.	Remarks	



Organic Analysis Base/Neutral/Acid Extractables Request Sheet



Organic parameters are grouped by methodologies and program lists. The compounds regulated under the State Drinking Water Act are listed on a separate request sheet due to the extensive lists and numerous methodologies involved. Use the Other space on the Organics Analysis Request Sheet for parameters not listed.

Routine Semivolatiles, Pesticides and PCBs

The following groups are compounds typically requested by the water programs and Solid/Hazardous Management. These compounds are found in the National Pollution Discharge Elimination System (NPDES) list and are the extractables that have always been on the request sheets.

- **NPDES Extractables**
- **Pesticides/PCBs**

To collect for these extractables:

Water: One 1-gallon amber bottle, acetone-rinsed and teflon-lined cap.
Holding time – 7 days to extract; 40 days to analyze

Sediment: One 16-ounce amber jar, acetone-rinsed and teflon-lined lid.
Holding time – 14 days

TAL (Target Analyte List), Semivolatiles and Pesticides/PCBs

The following groups of compounds are typically requested by the Superfund programs.

- **TAL Semivolatiles**
- **Pesticides/PCBs**

To collect for these extractables:

Water: One 1-gallon amber bottle, acetone-rinsed and teflon-lined cap.
Holding time – 7 days to extract; 40 days to analyze

Sediment: One 16-ounce amber jar, acetone-rinsed and teflon-lined lid.

Nitrobenzenes

These 6 compounds are requested at various Superfund sites where explosives are suspected.

To collect for these samples:

Water: Two 1-liter amber bottles, acetone-rinsed and teflon-lined cap.

Toxicity Characteristic Leaching Procedure (TCLP) Extractables

These are the 22 compounds regulated by the toxicity characteristic rule. To request all the organics regulated by the rule you will also need to ask for the TCLP volatiles listed on the Volatiles and Petroleum Hydrocarbon Request Sheet. To collect the TCLP extractables:

Routine soil or sediment sample: One 16-ounce amber jar with teflon-lined lid.

Lightweight sample, such as ash, or sample with a high moisture content: At least two 16-ounce jars are needed. If you have questions about the sample matrix or amounts, call the laboratory to consult about the number to collect or collect extra jars to be sure there is enough sample to perform the test.

Organic Analysis Volatiles and Petroleum Hydrocarbons Request Sheet



Organic parameters are grouped by methodologies and program lists. The compounds regulated under the Safe Drinking Water Act are listed on a separate request sheet due to the extensive lists and numerous methodologies involved. Use the Other space for parameters not listed.

National Pollution Discharge Elimination System (NPDES) Volatiles

These compounds are routine volatile parameters and are typically requested by the water programs and Solid/Hazardous Waste Management. These compounds are the volatiles that have always been on the sample request sheet. To collect for these volatiles:

Water: Five 40-ml amber vials, teflon-lined septa caps, **no headspace.**

Holding time – 14 days.

Sediment: One 4-ounce amber jar, teflon-lined septa cap.

Holding time – 14 days.

TAL (Target Analyte List) Volatiles - 8260A

These are the Target Analyte List (TAL) volatile parameters. These are the compounds typically requested by the Superfund programs. To collect for these volatiles:

Water: Five 40-ml amber vials, teflon-lined septa caps, **no headspace.**

Holding time – 14 days.

Low-level sediment: One 4-ounce amber jar, teflon-lined septa cap + 3 EnCore sampling devices. **EnCore devices must be received in the Central Laboratory within 24 hours of collection in order to be preserved.** Once preserved, the holding time is 14 days.

High-level sediment or waste: One 4-ounce amber jar, teflon-lined septa cap.

Toxicity Characteristic Leaching Procedure (TCLP) Volatiles

These are the 10 compounds regulated by the toxicity characteristic rule. To request all the organics regulated by the rule, you will also need to ask for the TCLP extractables listed on the Base/Neutral/Acid Extractables Request Sheet. To collect the TCLP volatiles:

Routine soil or sediment sample: One 4-ounce amber jar, teflon-lined septa cap.

Lightweight sample, such as ash, or sample with a high moisture content: At least two 16-ounce jars are needed. If you have questions about the sample matrix or amounts, call the laboratory or collect extra jars so we can perform the test.

Petroleum Analyses

The following groups of compounds are typically requested by the Underground Storage Tank Division.

- **BTEX - 8260A - UST** are individual compounds found in many petroleum products.
- **EPH by GC** are gas chromatography methods for extractable petroleum hydrocarbons.

These analyses are gasoline range organics (**GRO**) and extractable petroleum hydrocarbons **EPH**.

Samples for these procedures are collected as follows;

Water: BTEX and GRO - Five 40-ml amber vials, teflon-lined septa cap, **no headspace.**

EPH – One 1-gallon amber bottles, acid-preserved.

Sediment: BTEX and GRO - One 4-ounce amber jar, teflon-lined septa cap.

EPH - One 16-ounce amber jar, teflon-lined cap.

State of Tennessee - Environmental Laboratories



PLEASE PRINT LEGIBLY

Organic Analysis

Volatiles and Petroleum Hydrocarbons

Laboratory Number

PROJECT/SITE NO.		PROJECT NAME	
STATION NUMBER		COUNTY	
DESCRIPTION			
STREAM MILE	DEPTH	MATRIX	
COLLECTED DATE		TIME	
SAMPLER'S NAME (printed)			
SAMPLING AGENCY		BILLING CODE	
IF PRIORITY, DATE NEEDED			
SEND REPORT TO:			
CONTACT HAZARD			
NPDES Volatiles - 824	TCL Volatiles - 8280A	TCLP Volatiles	
Bromoform	Chloromethane	Benzene	
Bromodichloromethane	Bromomethane	Carbon tetrachloride	
Carbon Tetrachloride	Vinyl chloride	Chlorobenzene	
Chlorobenzene	Chloroethane	Chloroform	
Chloroethane	Methylene chloride	1,2-Dichloroethane	
2-Chloroethylvinyl ether	Acetone	1,1-Dichloroethane	
Chloroform	Carbon disulfide	Methyl ethyl ketone	
Chloromethane	1,1-Dichloroethane	Tetrachloroethene	
Dibromochloromethane	1,1-Dichloroethane	Trichloroethene	
1,2-Dichlorobenzene	Cis-1,2-dichloroethene	Vinyl chloride	
1,3-Dichlorobenzene	Trans-1,2-dichloroethene	BTEX - 8260A - UST	
1,4-Dichlorobenzene	1,2-Dichloroethane	Benzene	
Dichlorodifluoromethane	Chloroform	Toluene	
1,1-Dichloroethane	2-Butanone	Ethyl benzene	
1,2-Dichloroethane	1,1,1-Trichloroethane	o-Xylene	
1,1-Dichloroethene	Carbon tetrachloride	m-Xylene	
Cis-1,2-dichloroethene	Vinyl acetate	p-Xylene	
Trans-1,2-dichloroethene	Bromodichloromethane	Methyl t-butyl ether	
1,2-Dichloropropane	1,2-Dichloropropane	Diisopropyl ether	
Cis-1,3-dichloropropene	Cis-1,3-dichloropropene	TPH by GC	
Trans-1,2-dichloroethene	Trichloroethene	Gasoline Range Organics	
Methylene chloride	Dibromochloromethane	Diesel Range Organics	
1,1,2,2-Tetrachloroethane	1,1,2-Trichloroethane	Oil Range Organics	
Tetrachloroethene	Benzene	Other	
1,1,1-Trichloroethane	Trans-1,3-dichloropropene		
1,1,2-Trichloroethane	Bromoform		
Trichloroethene	4-Methyl-2-pentanone		
Trichlorofluoromethane	2-Hexanone		
Vinyl chloride	Tetrachloroethene		
Benzene	Toluene		
Ethylbenzene	1,1,2,2-Tetrachloroethane		
Toluene	Chlorobenzene		
o-Xylene	Ethyl benzene		
m-Xylene	Styrene		
p-Xylene	o-Xylene		
	m-Xylene		
	p-Xylene		

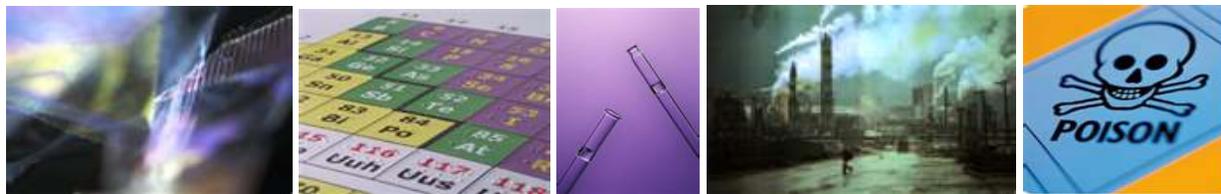
Chain of Custody and Supplemental Information

Only one chain of custody form is required per sample set or point (if all collected at the same time)

1. Collected by	
Date	Time
Delivered to	
Date	Time
2. Received by	
Date	Time
Delivered to	
Date	Time
3. Received by	
Date	Time
Delivered to	
Date	Time
4. Received in Lab by	
Date	Time
Logged in by	
Date	Time

Additional Information

1. Approximate volume of sample
2. Nearest town or city
3. Others present at collection
4. Number of other samples collected at same time at this point
5. Field collection procedure, handling and/or preservation of this sample
6. Mode of transportation to lab
7. Sample sealed by
8. Date sample sealed
9. Remarks



Inorganic Analysis Request Sheet Definitions and Requirements for Testing

The information contained in these pages is split into notes and charts giving definitions, requirements for testing, containers and analytical holding times.

Environmental Microbiology

The Environmental Microbiology Sections of the Microbiology Laboratories perform the tests as listed on the Inorganic Analysis Request Sheet. For bottle requirements and holding times refer to Chart **V - 1 ENVIRONMENTAL MICROBIOLOGY TESTS**, page **VI - 14**.

Ambient Parameters

Ambient parameters are used by the Water Pollution Control Division. These parameters are also known as an "EPA run." Refer to Chart **VI - 2 AMBIENT PARAMETERS: TESTS, CONTAINERS and HOLDING TIMES**, page **VI - 15**.

General Inorganics

This group of analyses was formerly known as the anions' parameters. General inorganics is a true representation of a wide variety of tests. It is important to pay close attention to the chart because of the variety of tests and their collection requirements. Bottle types, preservatives and holding times vary. Be aware of the tests that you need and make sure you have the proper collection vessels before going into the field. The laboratory will assist you by supplying the necessary vessels. Refer to Chart **V - 3 GENERAL INORGANICS: TESTS, CONTAINERS and HOLDING TIMES**, page **VI - 16**.

Metals

The Metals Section is self-explanatory. The metals listed here are the ones most commonly requested. If there are some you need that are not represented, ask the laboratory. Refer to Chart **VI - 4 METALS: TESTS, CONTAINERS and HOLDING TIMES**, page **VI - 17**.

You will note on the chart that we request you use a separate vessel for collection of mercury whenever possible. Although EPA says that plastic or glass is suitable for collection, we ask for the separate bottle simply for volume requirements. We want to make sure that there is enough sample volume to analyze for all your requested metals and have enough for quality control analysis.

Toxicity Characteristic Leaching Procedure (TCLP)

The TCLP test is used to simulate the mobility of metals from wastes in a landfill-type environment. The test is used primarily by the Divisions of Solid Waste Management and Superfund for regulating and characterizing wastes. Refer to Chart **VI - 4, METALS: TESTS, CONTAINERS and HOLDING TIMES**, page **VI - 17**.

Field Determinations

The tests listed here have traditionally been field procedures. Many of these tests are specified in EPA protocol to be tested immediately at the point of collection. This gives the truest representation of these parameters.

Inorganics Analysis Request Sheet (Continued)



**Chart VI - 1
 Environmental Microbiology Tests**

ANALYTE	CONTAINER	HOLDING TIME
Coliform, fecal	125- or 250-ml plastic bottle * preserved with sodium thiosulfate; pack on ice after collecting.	6 hours
Coliform, total	125- or 250-ml plastic bottle *preserved with sodium thiosulfate.	48 hours
Strep, fecal	125- or 250-ml plastic bottle *preserved with sodium thiosulfate; pack on ice after collecting.	6 hours

* The collection bottle is labeled with two dates -- a preparation date and an expiration date.

Inorganics Analysis Request Sheet (Continued)

**Chart VI - 2
 Ambient Parameters: Tests, Containers and Holding Times**

TEST	CONTAINER ¹		HOLDING TIME	
	Liquid	Solid	Liquid	Solid
COD ²	Nutrient		28 days	
Coliform, fecal ²	125- or 250-ml plastic preserved with sodium thio-sulfate, pack on ice		6 hours	
Conductivity ²	Routine		28 days	
Hardness, total ²	Routine		14 days	
Nitrogen, ammonia	Nutrient	16-ounce glass or plastic	28 days	None
Nitrogen, NO ₃ & NO ₂	Nutrient	16-ounce glass or plastic	28 days	None
Nitrogen, total kjeldahl	Nutrient	16-ounce glass or plastic	28 days	None
Phosphate, total	Nutrient	16-ounce glass or plastic	28 days	None
pH	Routine	16-ounce glass or plastic	Test immediately	None
Residue, dissolved ²	Routine		7 days	
Residue, suspended ²	Routine		7 days	
Arsenic, As ³	Metals	16-ounce glass or plastic	6 months	None
Cadmium, Cd ³	Metals	16-ounce glass or plastic	6 months	None
Chromium, Cr ³	Metals	16-ounce glass or plastic	6 months	None
Copper, Cu ³	Metals	16-ounce glass or plastic	6 months	None
Lead, Pb ³	Metals	16-ounce glass or plastic	6 months	None
Mercury, Hg ³	Metals	16-ounce glass or plastic	28 days	None
Nickel, Ni ³	Metals	16-ounce glass or plastic	6 months	None
Zinc, Zn ³	Metals	16-ounce glass or plastic	6 months	None

¹ See Chart V - 5 INORGANIC ANALYSIS: BOTTLES AND PRESERVATIVES, page VI - 18, for descriptions of containers and preservatives.

² Analyses performed only on water.

³ All metals can be taken from the same bottle. It is preferable to take mercury from a mercury bottle to ensure having enough sample.

Inorganics Analysis Request Sheet (Continued)

**Chart VI - 3
 General Inorganics: Tests, Containers and Holding Times**

TEST	CONTAINER ¹		HOLDING TIME	
	Liquid	Solid	Liquid	Solid
Acidity ²	Routine		14 days	
Alkalinity ²	Routine		14 days	
Alkalinity, phen. ²	Routine		14 days	
BOD, 5-day ²	Routine		48 hours	
CBOD, 5-day ²	Routine		48 hours	
Boron	Boron	16-ounce plastic or glass	6 months	None
Chloride ²	Routine		28 days	
Chlorine, residual ²	Routine		Test immediately	
Chromium, hexavalent	Routine	16-ounce plastic or glass	24 hours	None
COD ²	Nutrient		28 days	
Color, apparent ²	Routine		48 hours	
Color, true ²	Routine		48 hours	
Conductivity ²	Routine		28 days	
Cyanide	Cyanide	16-ounce plastic or glass	14 days	None
Flash point ²	16-oz glass jar		None specified	
Fluoride ²	Routine		28 days	
Hardness, calcium ²	Routine		14 days	
Hardness, total ²	Routine		14 days	
Hydrocarbons, total	O&G	16-ounce glass	28 days	None
MBAS ²	Routine		48 hours	
Nitrogen, ammonia	Nutrient	16-ounce plastic or glass	28 days	None
Nitrogen, nitrate ²	Nutrient & routine	48 hours		
Nitrogen, nitrite ²	Routine		48 hours	
Nitrogen, NO ₃ & NO ₂	Nutrient	16-ounce plastic or glass	28 days	None
Nitrogen, total kjeldahl	Nutrient	16-ounce plastic or glass	28 days	None
Nitrogen, total organic	Nutrient	16-ounce plastic or glass	28 days	None
Oil and grease	O&G		28 days	
Orthophosphate, total ²	Routine		48 hours	
Oxygen, dissolved ²	Routine		Test immediately	
pH	Routine	16-ounce plastic or glass	Test immediately	None
Phenols, total	Phenol	16-ounce plastic or glass	28 days	None
Phosphate, total	Nutrient	16-ounce plastic or glass	28 days	None
Residue, dissolved ²	Routine		7 days	
Residue, settleable ²	Routine		48 hours	
Residue, suspended ²	Routine		7 days	
Residue, total ²	Routine		7 days	
Silica ²	Routine		7 days	
Sulfate ²	Routine		28 days	
Sulfide, total ²	Sulfide		7 days	
TOC ²	Nutrient		28 days	
Turbidity ²	Routine		48 hours	
Percent solids		16-ounce plastic or glass		None

¹ Refer to Chart VI - 5 INORGANIC ANALYSIS: BOTTLES AND PRESERVATIVES, page VI - 18, for descriptions of containers and preservatives.

² Analyses performed only on water.

Inorganics Analysis Request Sheet (Continued)

**Chart VI - 4
 Metals: Tests, Containers and Holding Times**

METALS	TCLP METALS
Aluminum, Al Antimony, Sb Arsenic, As Barium, Ba Beryllium, Be Cadmium, Cd Calcium, Ca Chromium, Cr Cobalt, Co Copper, Cu Iron, Fe Lead, Pb Magnesium, Mg Manganese, Mn Mercury, Hg Nickel, Ni Potassium, K Selenium, Se Silver, Ag Sodium, Na Thallium, Tl Vanadium, V Zinc, Zn	Arsenic, As Barium, Ba Cadmium, Cd Chromium, Cr Lead, Pb Mercury, Hg Selenium, Se Silver, Ag
<p><u>Containers (Liquids)</u></p> <p>Metals bottle: 1-liter plastic bottle, preserved with 5 ml of nitric acid.</p> <p>Mercury bottle: 500-ml glass or plastic bottle, preserved with 2.5 ml of nitric acid. Note that mercury can be taken from the metals bottle. The use of a separate bottle for mercury gives the laboratory more sample for analysis especially when a large number of metals are requested.</p>	<p><u>Containers (TCLP)</u></p> <p>Solids: Collect one 16-ounce glass jar, no preservative.</p> <p>Semisolids: Collect at least two 16-ounce glass jars, no preservative.</p>
<p><u>Containers (Solids)</u></p> <p>16-ounce plastic cup or glass jar, no preservative.</p> <p><u>Holding Time (Liquids)</u></p> <p>Mercury: 28 days. All others: 6 months.</p>	<p><u>Holding Time (TCLP)</u></p> <p>From field collection to TCLP extraction: Mercury – 28 days; metals – 180 days</p> <p>From preparative extraction to analysis: Mercury – 28 days; metals – 180 days</p>
<p><u>Holding Time (Solid)</u></p> <p>None listed.</p>	

Inorganics Analysis Request Sheet (Continued)

**Chart VI - 5
 Inorganic Analysis: Bottles and Preservatives**

BOTTLE NAME	BOTTLE TYPE¹	PRESERVATIVE
Routine	1-liter plastic or 1-gallon plastic	None
Nutrient	500-ml plastic	1 ml sulfuric acid
Metals	1-liter plastic	5 ml nitric acid
Mercury	500-ml plastic or glass	2.5 ml nitric acid
Cyanide	1-liter plastic	pH>12, 5 ml of 50% sodium hydroxide at collection 0.6 g ascorbic acid if KI paper indicates chlorine
Oil & Grease/TPH	1-liter glass, wide mouth	2 ml sulfuric acid
Phenol	1-liter glass, amber	2 ml sulfuric acid
Sulfide	500-ml glass	2 ml zinc acetate in laboratory 5 ml of 50% sodium hydroxide in field
Boron	125-ml plastic	0.75 ml hydrochloric acid
Flash Point	16-ounce glass jar	None
Solids/Sediments	16-ounce glass jar or plastic cup	None
Oil & Grease/TPH (solids)	16-ounce glass jar	None
TCLP	16-ounce glass jar or plastic cup	None

¹All plastics are used only one time.

Note: An identical chart to this one is in the Safe Drinking Water Parameters Request Sheet Section (Chart VI - 7, page VI - 23).



Safe Drinking Water Parameters Request Sheet Organics

The compounds regulated under the Safe Drinking Water Act (SDWA) are listed on one page due to the extensive lists and numerous methodologies involved. Use the Other space to write in any parameter not listed. Also, if chlorinated water is sampled, bottles must be preserved in a non-routine manner. Please notify the lab and obtain properly preserved bottles on any drinking water sampling event.

Routine SDWA Extractables

The following groups of parameter or individual compounds are easily analyzed and require few extractions.

- **CI Pesticides/PCBs – 508**; Holding time: 7 days to extract.
- **N/P Pesticides – 507**; Holding time: 7 days to extract.
- **CI Acids – 515.2**; Holding time: 7 days to extract.
- **PAH's Method 550** - includes naphthalene and benzo(a)pyrene. (This group should have been designated in a gray area with bold print on the Safe Drinking Water Parameters Request Sheet but was not. In addition, naphthalene should be included in the volatile list for lowest detection limits. These corrections will be made on the next printing of the revised forms.) Holding time: 7 days to extract; 30 days to analyze.
- **Adipate, Phthalates – 525**

To collect for the above compounds:

Water: One 1-gallon amber bottle, teflon-lined cap.

Non-Routine SDWA Extractables

The following SDWA extractable parameters are difficult to analyze and require many extractions and various bottle preparations. If you need to collect for these compounds, call the laboratory before collection. Bottles for these analyses are not kept in stock. The sample containers must be fresh to eliminate sample contamination and ensure proper preservation. Also, some parameters require special collection and handling techniques.

- **Carbamates - 531.1**
- **Phthalates – 506**
- **EDB, DBCP – 504**
- **Glyphosate - Method 547**
- **Endothall - Method 548.1**
- **Dalapon - Method 552.1**
- **Diquat – 549.1**

Safe Drinking Water Parameters Request Sheet (Continued)

SDWA Volatile Parameters

The following group of parameters are volatile compounds and are collected in four 40-ml amber vials, teflon-lined, septa cap, **no headspace**.

(Naphthalene should have been included in the volatile list for lowest detection limits. This correction will be made on the next printing.)

- **SDWA Volatiles - 524.2**; Holding time: 14 days

Inorganics

Definitions and Requirements for Testing

The primary and secondary drinking water parameters are listed in **Chart VI - 6 SAFE DRINKING WATER PARAMETERS – INORGANICS**. These parameters include a mix of general inorganic tests and metals. The general inorganic tests have many different collection and preservation requirements. The metals can be analyzed from a single, properly preserved container. Use the **Other** space to write in parameters not listed, requirement for testing, containers and analytical holding times.

State of Tennessee Environmental Laboratories
PLEASE PRINT LEGIBLY



Safe Drinking Water Parameters

PROJECT/SITE NO.		PROJECT NAME		Inorganics		Laboratory Number
STATION NUMBER		COUNTY		Primary Standards		
DESCRIPTION				1074	Antimony	Branch Lab Number
STREAM MILE		DEPTH		1003	Arsenic	
COLLECTED: DATE		MATRIX		1004	Asbestos	
SAMPLER'S NAME(printed)		TIME		1010	Barium	
SAMPLING AGENCY		BILLING CODE		1075	Beryllium	Chain of Custody and Supplemental Information
IF PRIORITY, DATE NEEDED				1016	Cadmium	
SEND REPORT TO:				1020	Chromium	
CONTACT HAZARD				1024	Cyanide	
				1025	Fluoride	
				5000	Lead	
				1036	Mercury	
				1036	Nickel	
				1041	Nitrite (as N)	
				1040	Nitrate (as N)	
				1038	Nitrate/Nitrite (Tot. as N)	
				1045	Selenium	
				1065	Thallium	
				Secondary Standards		
				1002	Aluminum	
				1017	Chloride	
				1905	Color	
				1022	Copper	
				1919	Hardness-Calcium	
				1028	Iron	
				1997	Langlier Index	
				1032	Manganese	
				1089	MBAS	
				1925	pH	
				1050	Silver	
				1052	Sodium	
				1055	Sulfate	
				1927	Total Alkalinity	
				1930	Total Dissolved Solids	
				0100	Turbidity	
				1095	Zinc	
2993	Bromobenzene	2998	n-Propylbenzene	2051	Alachlor	Delivered to
2430	Bromochloromethane	2986	1,1,1,2-Tetrachloroethane	2050	Atrazine	Date
2943	Bromodichloromethane	2988	1,1,2,2-Tetrachloroethane	2078	Butachlor	Time
2942	Bromoform		Tetrachloroethane	2045	Metolachlor	Delivered to
2214	Bromomethane		Toluene	2695	Metribuzin	Date
2422	n-Butylbenzene	2420	1,2,3 Trichlorobenzene	2037	Simazine	Time
2428	sec-Butylbenzene		1,2,4-Trichlorobenzene	2110	2,4,5-TP (Silvex)	Delivered to
2426	tert-Butylbenzene		1,1,1-Trichloroethane	2105	2,4-D	Date
	Carbon tetrachloride		1,1,2-Trichloroethane	2440	Dicamba	Time
	Chlorobenzene		Trichloroethene	2041	Dinoseb	Delivered to
2216	Chloroethane	2218	Trichlorofluoromethane	2328	Pentachlorophenol	Date
2941	Chloroform	2414	1,2,3-Trichloropropane	2040	Picloram	Time
2210	Chloromethane	2410	1,2,4-Trimethylbenzene		Datapon	Delivered to
2985	2-Chlorotoluene	2424	1,3,5-Trimethylbenzene		Carbamates - 531.1	Date
2988	4-Chlorotoluene		Vinyl chloride	2066	3-Hydroxycarbofuran	Time
2944	Dibromochloromethane		m-Xylene	2047	Aldicarb	1. Approximate volume of sample
2408	Dibromomethane		p-Xylene	2044	Aldicarb Sulfone	
	1,2-Dichlorobenzene		1,3-Dichlorobenzene	2043	Aldicarb Sulfoxide	2. Nearest town or city
2967	1,3-Dichlorobenzene		1,4-Dichlorobenzene	2021	Carbaryl	3. Others present at collection
	1,4-Dichlorobenzene		CI Pesticides/PCBs 508	2046	Carbofuran	
2212	Dichlorodifluoromethane	2358	Aldrin	2022	Methionyl	4. Number of other samples collected at same time at this point
2878	1,1-Dichloroethane	2959	Chlordane	2036	Oxamyl	
	1,2-Dichloroethane	2364	Dieldrin		PAHs - 650	
	1,1-Dichloroethene	2005	Endrin	2306	Benzo(a)pyrene	
	Cis-1,2-dichloroethene	2065	Heptachlor		Method 525	
	Trans-1,2-dichloroethene	2067	Heptachlor Epoxide	2036	Adipates	5. Field collection procedure, handling and/or preservation of this sample
	1,2-Dichloropropane	2274	Hexachlorobenzene	2036	Phthalates	
2412	1,3-Dichloropropane	2010	Lindane		Method 504	
2416	2,2-Dichloropropane	2015	Methoxychlor	2931	DBCP	
2410	1,1-Dichloropropene	2383	PCBs	2936	EDB	6. Mode of transportation to lab
2413	Cis-1,3-dichloropropene	2077	Propachlor		Glyphosate - Method 547	
	Trans-1,3-Dichloropropene	2020	Toxaphene			7. Sample sealed by
	Ethylbenzene	2042	Hexachlorocyclopentadiene		Endothall - Method 548.1	8. Date sample sealed
2994	Isopropylbenzene		Hexachlorobutadiene			9. Remarks
2030	4-Isopropyltoluene				Method 549.1	
	Methylene chloride			2032	Diquat	
	Naphthalene				Paraquat	

Safe Drinking Water Parameters Request Sheet (Continued)

**Chart VI - 6
 Safe Drinking Water Parameters -- Inorganics**

Primary Standards

ANALYTES	CONTAINERS ¹	HOLDING TIMES
Antimony	Metals ²	6 months
Arsenic	Metals	6 months
Asbestos ³	Routine	None
Barium	Metals	6 months
Beryllium	Metals	6 months
Cadmium	Metals	6 months
Chromium	Metals	6 months
Cyanide	Cyanide	14 days
Fluoride	Routine	28 days
Lead	Metals	6 months
Mercury	Mercury ²	28 days
Nickel	Metals	6 months
Nitrite (as N)	Routine	48 hours
Nitrate (as N)	Nutrient & routine	48 hours
Nitrate/nitrite (total as N)	Nutrient	28 days
Selenium	Metals	6 months
Thallium	Metals	6 months

Secondary Standards

ANALYTES	CONTAINERS ¹	HOLDING TIMES
Aluminum	Metals	6 months
Chloride	Routine	28 days
Color	Routine	48 hours
Copper	Metals	6 months
Hardness, calcium	Routine	14 days
Iron	Metals	6 months
Langlier index ⁴	Call laboratory for information	Call laboratory for information
Manganese	Metals	6 months
MBAS	Routine	48 hours
pH	Routine	Test immediately
Silver	Metals	6 months
Sodium	Metals	6 months
Sulfate	Routine	28 days
Total alkalinity	Routine	14 days
Total dissolved solids	Routine	7 days
Turbidity	Routine	48 hours
Zinc	Metals	6 months

¹ See Chart VI - 7 INORGANIC ANALYSIS: BOTTLES AND PRESERVATIVES, page VI - 23, for descriptions of containers and preservatives.

² All metals can be taken from the same bottle. It is preferable to take mercury from a mercury bottle to ensure having enough sample.

³ Asbestos in water will need to be contracted. Call the laboratory if you require this test.

⁴ Langlier index is a measure of corrosivity and is comprised of several tests. If you need this test, call the laboratory for information.

Safe Drinking Water Parameters Request Sheet (Continued)

**Chart VI - 7
 Inorganic Analysis: Bottles and Preservatives**

BOTTLE NAME	BOTTLE TYPE¹	PRESERVATIVE
Routine	1-liter plastic or 1-gallon plastic	None
Nutrient	500-ml plastic	1 ml sulfuric acid
Metals	1-liter plastic	5 ml nitric acid
Mercury	500-ml plastic or glass	2.5 ml nitric acid
Cyanide	1-liter plastic	pH>12, 5 ml of 50% sodium hydroxide at collection 0.6 g ascorbic acid if KI paper indicates chlorine
Oil & Grease/TPH	1-liter glass, wide mouth	2 ml sulfuric acid
Phenol	1-liter glass, amber	2 ml sulfuric acid
Sulfide	500-ml glass	2 ml zinc acetate in laboratory 5 ml of 50% sodium hydroxide in field
Boron	125-ml plastic	0.75 ml hydrochloric acid
Flash Point	16-ounce glass jar	None
Solids/Sediments	16-ounce glass jar or plastic cup	None
Oil & Grease/TPH (solids)	16-ounce glass jar	None
TCLP	16-ounce glass jar or plastic cup	None

¹All plastics are one time use.

Note: An identical chart to this one is in the Inorganic Analysis Request Sheet Section (Chart VI - 5, page VI - 18).



Aquatic Biology - Biological Analysis Request Sheet

Instructions for Completing the Biological Analysis Request Sheet

Sample Identification Information

This information is located in the upper left-hand shaded box. It must be filled out completely by the sampler.

Project/Site No.: For sampling locations that have a permanent site designation or are part of a project that has a designated project number. (*For example, a private well sampled as part of a Superfund project.*) This does not need to be filled out if there is no project or site number associated with the sample.

Project Name: The designated name for the project number entered in the **Project/Site No.** It is also used for sites with no project number that are part of a larger investigation. (*For example, Industry Q might be the project name for several sites located on various streams that might be investigated in association with Industry Q.*)

Station No.: The field number assigned by the sampler that uniquely identifies the point at which the sample was taken. (*For example DC1.*)

County: Designated by the two-digit county code used by state agencies.

Description: The stream name and sample location. (*For example Dirty Creek 500 yards upstream outfall 001.*)

Stream Mile: The stream mile of a navigable river or stream. This is important information.

Depth: The depth at which the water sample was collected. It is only needed for chlorophyll samples.

Collection Date: The date the sample was collected.

Time: The time the sample was collected in military time (24-hour clock time).

Sampler's Name: Includes the first and last name printed legibly.

Sampling Agency: The agency collecting the sample. (*For example WPC TDEC.*)

Billing Code: The TDEC billing code and cost center for purchase of laboratory services assigned to the various TDEC programs to which the analyses performed on a sample are billed. (*Example 777.88 -99.*)

If Priority, Date Needed: Must be filled out if results are needed by a particular date as determined by health effect emergency or program determined priority. **ASAP is not appropriate.**

Send Report To: The person and a complete address of where the sample report should be sent.

Contact Hazard: A listing of any known hazard related to the sample (chemical, physical, or biological). **Do not put none.** Write unknown if you are not aware of a hazard.

STATE OF TENNESSEE - ENVIRONMENTAL LABORATORIES

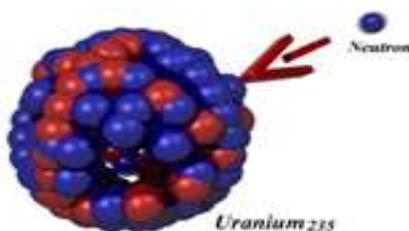
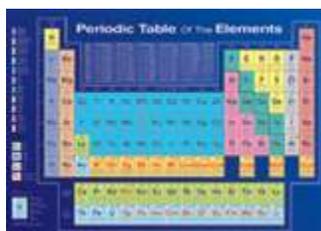


Biological Analysis

Please Print Legibly

**Schedule must be arranged in advance for all tests (615) 262-6327

Project/Site No.	Screening Bioassays	Chronic Bioassays	Branch Lab Number
Project Name	(Cannot be used for permitting)	Chronic Cd	Chain of Custody (sign full name)
Station No. County	48 hr Static Screening Cd	Log Number	1. Collected by
Description	Log Number	LC50 @ 24 hrs	Date Time
Stream Mile Depth	LC50 @ 24 hrs	LC50 @ 48 hrs	Delivered to
Collection Date Time	LC50 @ 48 hrs	LC50 @ 72 hrs	Date Time
Sampler's name (Print)	48 hr Static Screening Pp	LC50 @ 96 hrs	2. Received by
Sampling Agency	Log Number	Survival	Date Time
Billing Code	LC50 @ 24 hrs	NOAEC	Delivered to
If Priority, Date Needed	LC50 @ 48 hrs	LOAEC	Date Time
Send Report to		Reproduction	3. Received by
	Acute Bioassays	NOAEC	Date Time
	48 hr Static Definitive Cd	LOAEC	Delivered to
Contact Hazard	Log Number	IC25	Date Time
Date Reported By	LC50 @ 24 hrs	Chronic Pp	4. Rec'd in Lab by
Reviewed By	LC50 @ 48 hrs	Log Number	Date Time
Reviewed by	NOAEC	LC50 @ 24 hrs	Logged in by
BIOLOGICAL SURVEYS	LOAEC	LC50 @ 48 hrs	Date Time
Macroinvertebrate Recon	48 hr Static Definitive Pp	LC50 @ 72 hrs	Additional Information
Rapid Bioassessment (State SOP)	Log Number	LC50 @ 96 hrs	1. Approx. volume of sample
Intensive Survey - Surber	LC50 @ 24 hrs	LC50 @ 120 hrs	2. Nearest town or city
Intensive Survey - Dendy	LC50 @ 48 hrs	LC50 @ 144 hrs	
Fish Population Recon	NOAEC	LC50 @ 168 hrs	3. Others present at collection
Fish Population Intensive	LOAEC	Survival	
Fish Tissue Collection	96 hr Static Definitive Cd	NOAEC	4. Number of other samples collected at same
Chlorophyll Analysis	Log Number	LOAEC	time at this point
Log Number	LC50 @ 24 hrs	Growth	
Chlorophyll a	LC50 @ 48 hrs	NOAEC	5. Field collection procedure, handling and/or
Pheophyton	LC50 @ 72 hrs	LOAEC	preservation of this sample
SPECIAL STUDIES	LC50 @ 96 hrs	IC25	
(Please Specify)	NOAEC	Chlorine Residual	6. Mode of transportation to lab
	LOAEC		
	96 hr Static Definitive Pp	Lab Parameters	7. Sample/cooler sealed by
	Log Number	pH	
	LC50 @ 24 hrs	Cond.	8. Date sample/cooler sealed
	LC50 @ 48 hrs	D.O.	9. Remarks
	LC50 @ 72 hrs	Temp.	
	LC50 @ 96 hrs		
	NOAEC		
	LOAEC		



Radiochemical Analysis Request Sheet

Instructions for Completing the Radiochemical Analysis Request Sheet

Sample Identification Information

This information is located in the upper left-hand shaded box. It must be filled out completely by the sampler.

Project/Site No.: The unique number that is assigned to the project by the program area/ sampling agency. This does not need to be filled out if there is no project or site number associated with the sample.

Project Name: The main name for the project. (*For example DRH Monthly Monitoring, SEG Inspection, Clinch River Water Monitoring, DRH Weekly Air Monitoring.*)

Station Number: The field number assigned by the sampler that uniquely identifies the point at which the sample was taken. (*For example W64 or 5.*)

County: Designated by the two-digit county code used by state agencies.

Description: A complete description of the location at which the sample was taken. The sampler log number is entered at this point. (*For example SEG, Grassy Cr. @ Bear Cr Road/ROW-161.*)

Stream Mile: The stream mile of a navigable river or stream. (*For example 10.1 or 529.3*)

Depth: May be the depth sampled for a core sample of soil or the depth at which a water sample was collected in a well or body of water. (*For example 15.0 feet.*)

Collected: Date and Time -- List the time in military time (24-hour clock time). This information is essential for radiochemical analysis for the determination of decay factors.

Pick-Up Date: Filled in only when the sampler is picking up a sample that has been previously collected by someone else. (*For example, a composite sample sequentially collected by plant personnel.*)

Contact Hazard: A listing of any known hazards related to the sample (radiological, chemical, biologic, etc.). **Do not put none.** Write **unknown** if you are not aware of a hazard.

MR/hr Reading: Must be listed to determine if the level of radioactivity exceeds the Radio-chemistry Section's guidelines.

Sampler's Name: Include the first and last name printed legibly.

Sampling Agency: The agency for which the sample was collected. (*For example DRH or DOE-OS.*)

Billing Code: The TDEC billing code and cost center for purchase of laboratory services assigned to the various TDEC programs to which the analyses performed on a sample are billed. (*Example 327.36-90.*)

Radiochemical Analysis Request Sheet (Continued)

If Priority, Date Needed: Must be filled out if the analytical results are needed by a particular date as determined by health effect emergency or program determined priority. ASAP is not appropriate.

Send Report To: The person and complete address of where the sample report should be sent.

Sample Type: Self-explanatory. If none of the listed matrices apply, complete the Other line.

Field Comments: Any comments that the sampler feels are appropriate concerning the sampling process.

Air Samples Volume/Total Hours: Applies only to air filter samples. The volume with appropriate units is required for radiochemical analysis.

Sample Filtration/Sample Acidification; Instructs laboratory personnel as to the proper handling of water or liquid samples.

Requested Analyses: Self-explanatory. The sampler chooses the desired analyses for the collected sample.

Chain of Custody

This is required by the TDEC Office of General Counsel for samples that have the potential of being use in court, reviewed by state boards, or involved in state hearings. This entire area must be filled out completely to meet chain of custody requirements. Several program areas (UST, SWM, DSF) have mandated that chain of custody be filled out on all samples

1. The sampler signs his name in full in the **Collected By** space with the date and military time.
2. If the sampler gives the sample to anyone else before it is delivered to the laboratory, each person responsible by the sample must sign their full name on the **Received By** space with the date and military time. The person in the laboratory who receives the sample will sign line 4.

Additional Information

Completely fill out all the information under **Additional Information** including:

1. Approximate volume of sample
2. Nearest town or city
3. Others present at collection
4. Number of other samples collected at the same time at this point
5. Field collection procedure, handling and/or preservation of this sample (can write SOP if a written SOP was followed)
6. Mode of transportation to the laboratory (state vehicle, bus, UPS, etc.)
7. Sample/cooler sealed by
8. Date sample/cooler sealed
9. Remarks



Asbestos Analysis

INTRODUCTION – Many health hazards are associated with breathing asbestos fibers and the use of asbestos in building materials has been severely limited in the last several years. However, it is still a concern in older buildings, especially those undergoing renovation or demolition. The state laboratory can analyze unusual samples, such as dust, for major constituents like cloth fibers, pollen, mold, flyash or other materials. For the analysis of asbestos in bulk building materials, the state laboratory forwards samples to be analyzed by a laboratory certified through the National Voluntary Laboratory Accreditation Program.

SAMPLE COLLECTION - Collect a representative sample of material to be examined. Each sample must be placed in a clean individual container such as a film canister or prescription bottle. Small plastic zip-lock bags may also be used. Label the container to clearly identify the sample by date, location, field number, or other identifiers. Collection kit materials and requisition forms are available from your nearest state laboratory.

DOCUMENTATION - Use the Inorganic Analysis Form PH-3011 and indicate in the "other" column which test is to be performed. Be sure to complete all shaded areas of the form as well as the chain of custody portion if required.

SUBMITTING SAMPLE - Samples for asbestos or other microscopic examination may be submitted through any of the State Laboratories. They will be forwarded to the Knoxville Laboratory, where all testing is performed. If sending by mail or commercial courier, send directly to the Knoxville Laboratory. All samples must be submitted through state agencies that maintain a contract with Laboratory Services.

Knoxville Regional Laboratory	Phone: 865--549-5201
Tennessee Department of Health	Fax: 865-594-5199
1522 Cherokee Trail	
Knoxville TN 37920	

EXAMPLE OF TESTING AVAILABLE

TESTS PERFORMED	TYPE OF REPORT	TYPICAL SAMPLES TO SUBMIT FOR TESTING
Asbestos, complete	Analysis of all materials listed by constituent and percent.	Bulk insulation material Loose fill insulation Spray on insulation Pipe and boiler wraps Rolled insulation Roofing material Flooring material Plaster-like material
Asbestos, limited	Percent and type of asbestos only.	Same as above
Other Microscopic	Type and estimated percent of predominant material. Asbestos will be reported if found.	Dust Miscellaneous fibers Other unusual samples (call the lab before sending)

STATE OF TENNESSEE

ENVIRONMENTAL LABORATORIES

REQUEST FOR MICROSCOPIC ANALYSIS

Please complete shaded areas

PROJECT/SITE NO.	PROJECT NAME:
FIELD NUMBER:	COUNTY:
DESCRIPTION:	
SAMPLE TYPE : <input type="checkbox"/> BULK INSULLATION	<input type="checkbox"/> OTHER _____
DATE COLLECTED:	TIME:
SAMPLER'S NAME:	PHONE NUMBER:
AGENCY:	BILLING CODE:
SEND REPORT TO:	
	TEST REQUESTED
	<input type="checkbox"/> ASBESTOS
	<input type="checkbox"/> OTHER MICROSCOPIC

FOR LABORATORY USE ONLY

LABORATORY NUMBER	
DATE RECEIVED	
DATE REPORTED	
ANALYZED BY	

LABORATORY RESULTS:

Percent	Material	Percent	Material

UNSATISFACTORY FOR ANALYSIS _____

COMMENTS _____

Note: All asbestos analyses are performed in accordance with EPA Method 600/R-93/116. A visual estimation is used to determine the percent of asbestos present. The use of trade names is for identification purposes only. Results only apply to the individual sample submitted for analysis. This report may not be reproduced except in full without the written approval of the laboratory.