General
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Sample Disposal and Handling

Overview

The purpose of this document is to assist lab workers in the proper handling and disposal of both student and client samples at the Water Sciences Laboratory. This document includes instructions that cover common matrices and sub-sample types.

Sample Storage and Handling

All client and student samples are stored in either a refrigerator or freezer upon arrival, depending upon the analysis to be performed. Places where samples can be stored include Freezer 5 and 6 in Room 207A, Freezer 1 in Room 103, Freezer 3 in Room 103C, Refrigerator 1 near Room 109, and Refrigerator 2 in Room 103. Client and student samples will be stored for up to four weeks after completion of analyses, after which they will be disposed of. Extended storage of samples beyond the four weeks is permitted, but at the cost of $1/sample/month. Clients and students can pick up their samples before the four weeks are up if they would like to store their samples elsewhere. Clients must request or decline extended sample storage on the sample submission form. This information can also be found on the sample batch sheet, or in LIMS.

Waste Disposal

Use gloves and safety glasses or goggles when handling hazardous waste. All used organic solvents must be disposed of in the proper container in Room 203. Fill out the waste calculation sheet with the solvents collected, the approximate amounts, and composition (e.g. 200 mL 50% methanol/water). Do not allow any organic solvents to enter the sewer system, including organic solvents found in samples or sub-samples. All acid solutions must be neutralized with sodium bicarbonate, found underneath the sink in Room 203, before disposal down the drain in Room 205. Do not allow any un-neutralized acid solution to drain into any sink in the building, including acidic samples and sub-samples. If you are unsure if a solution is acidic, check it with a pH strip located in Room 203 before disposal. Check the Sewer Disposal List in Room 203 for a list of substances that are allowed to be disposed of down the sanitary sewer. Make sure to run water down the sink for a minute or two after any disposal event. Substances that cannot be disposed of down the sanitary sewer must be collected in a proper waste container and marked with an EHS tag.

For more information on proper waste disposal, please refer to the general Waste SOP.

Sample Disposal

AQ2

Samples for the AQ2 can either be original samples, or sub-samples from a parent sample. Both are generally kept in plastic bottles and are acidified with one drop of acid. Sub-samples (and original samples if a sub-sample was not taken) can be disposed of after four weeks. For parent samples, check on LIMS to see if all other tests have been run and approved. Confirm that all batch sheets have been returned for all tests run, and if it has been four weeks since the approval date for all tests, the parent sample can be disposed of as well. Any plastic or glass bottles should be saved and re-washed. Be sure to neutralize samples with sodium bicarbonate before disposal.

TOC/DOC

Samples for TOC/DOC are always sub-samples from a larger parent sample. They are stored in glass vials with a large white plastic cap. Excess sub-sample can be disposed of in the sanitary sewer, and can be disposed of once four weeks have passed since the data was approved. The empty TOC vials can be disposed of in the glass waste container in Room 203. For parent samples, check on LIMS to see if all other tests have been run and approved. Confirm that all batch sheets have been returned for all tests run, and if it has been four weeks since the approval date for all tests, the parent sample can be disposed of as well.

IC

IC samples are usually not sub-samples, although that is a possibility. These samples are never preserved, and are filtered into an IC vial before analysis. This means that all samples can be disposed of down the sanitary sewer. Empty IC vials can be disposed of in the glass waste container in Room 203.

Lachat

Lachat samples are generally kept in plastic bottles, and are usually a potassium chloride extraction from a soil core. The potassium chloride solution can be disposed of down the sanitary sewer. Plastic bottles that were filled with the potassium chloride extraction should be saved and re-washed. Soil cores can be disposed of around the back of the lab as long as they are not quarantined.

AA

Samples for the AA are comprised of both a parent sample, and a sub-sample. Sub-samples are stored in centrifuge tubes. 15 mL tubes contain filtered aliquots, and 50 mL tubes contain dilutions for the machine. These are kept in the refrigerator. All are acidified with nitric acid, and therefore should be neutralized with sodium bicarbonate before disposal into the sanitary sewer. Empty centrifuge tubes can be thrown away. For parent samples, check on LIMS to see if all other tests have been run and approved. Confirm that all batch sheets have been returned for all tests run, and if it has been four weeks since the approval date for all tests, the parent sample can be disposed of as well.

ICP-MS

ICP-MS samples can be both sub-samples and parent samples. The sub-samples are kept in 50 mL centrifuge tubes. These are kept in a refrigerator, and have been slightly acidified. These need to be neutralized before disposal down the acid sink in Room 205. Run water down the sink for a minute or two after disposal. Empty centrifuge tubes can be thrown away. Excess sample can be disposed of down the sanitary sewer.

LC/MS

Samples for the LC/MS can either be water, solid, slurry, or wastewater matrices. There is one vial and one cartridge associated with each sample that must be disposed of as well. Generally, this occurs at the same time as sample disposal. Vials are collected in a waste bucket located in Room 107. When full, this is tagged for collection by EHS. Cartridges can simply be thrown away. Water samples can be disposed of in the sanitary sewer, and soil samples can be thrown away, provided they are not quarantined. Sample containers should be saved and re-washed. Wastewater and slurry matrices, if they are particularly foul-smelling or dirty, can simply be thrown away in the sample container.

GC/MS

Samples for the GC/MS can either be water, solid, slurry, or wastewater matrices. There is one vial and one cartridge associated with each sample that must be disposed of as well. Generally, this occurs at the same time as sample disposal. Vials are collected in a waste bucket located in Room 107. When full, this is tagged for collection by EHS. Cartridges can simply be thrown away. Water samples can be disposed of in the sanitary sewer, and soil samples can be thrown away, provided they are not quarantined. Sample containers should be saved and re-washed. Wastewater and slurry matrices, if they are particularly foul-smelling or dirty, can simply be thrown away in the sample container.

Chlorophyll – All chlorophyll samples have been filtered and placed into a small glass vial with a black cap. They are usually covered with tinfoil to keep them from being exposed to light. The liquid inside is a mixture of 90% acetone and 10% water. This means they must be disposed of in the organic solvents container in Room 203. Make sure to fill out the form in front of the bottle with the approximate amount of solvent being added.

SUMMARY OF SPECIAL SAMPLING AND HANDLING REQUIREMENTS

The table below lists general sampling and handling requirements for different analyses. This table is intended to be used for guidance only, and if there is a discrepancy between this table and a specific method or SOP, the information in the most current SOP takes precedence. If performing a specific method for compliance purposes, please be aware that there may be alternative preservation and holding-time requirements, and in these cases the regulatory requirements should take precedence.

TABLE 1060:I. SUMMARY OF SPECIAL SAMPLING AND HANDLING REQUIREMENTS*

Determination	Container†	Minimum Sample Size *mL*	Sample Type‡	Preservation§	Maximum Storage Recommended	Regulatory‖
Acidity	P, G(B), FP	100	g	Cool, ≤6°C	24 h	14 d
Alkalinity	P, G, FP	200	g	Cool, ≤6°C	24 h	14 d
BOD	P, G, FP	1000	g, c	Cool, ≤6°C	6 h	48 h
Boron	F, P (PTFE) or quartz	1000	g, c	HNO_3 to pH<2	28 d	6 months
Bromide	P, G, FP	100	g, c	None required	28 d	28 d
Carbon, organic, total	G(B), P, FP	100	g, c	Analyze immediately, or cool ≤6°C and add HCl, H_3PO_4, or H_2SO_4 to pH	7 d	28 d
Carbon dioxide	P, G	100	g	Analyze immediately	0.25 h	N.S.
COD	P, G, FP	100	g, c	Analyze as soon as possible, or add H_2SO_4 to pH<2; Cool, ≤6°C	7 d	28 d
Chloride	P, G, FP	50	g, c	None required	N.S.	28 d
Chlorine, total, residual	P, G	500	g	Analyze immediately	0.25 h	0.25 h
Chlorine dioxide	P, G	500	g	Analyze immediately	0.25 h	N.S.
Chlorophyll	P, G	500	g	Unfiltered, dark, ≤6°C Filtered, dark, –20°C (Do not store in frost-free freezer)	24–48 h 28 d	N.S.
Color	P, G, FP	500	g, c	Cool, ≤6°C	24 h	48 h
Specific conductance	P, G, FP	500	g, c	Cool, ≤6°C	28 d	28 d
Cyanide						
Total	P, G, FP	1000	g, c	Analyze within 15 min. Add NaOH to pH>12 if sample is to be stored, Cool, ≤6°C, in dark. Add thiosulfate if residual chlorine present	24 h	14 d; 24 h if sulfide present
Amenable to chlorination	P, G, FP	1000	g, c	Remove residual chlorine with thiosulfate and cool ≤6 °C	stat	14 d; 24 h if sulfide present
Fluoride	P	100	g, c	None required	28 d	28 d
Hardness	P, G, FP	100	g, c	Add HNO_3 or H_2SO_4 to pH<2	6 months	6 months
Iodine	P, G	500	g	Analyze immediately	0.25 h	N.S.
Metals	P(A), G(A), FP (A)	1000	g, c	For dissolved metals filter immediately, add HNO_3 to pH<2	6 months	6 months
Chromium VI	P(A), G(A), FP (A)	250	g	Cool, ≤6°C, pH 9.3–9.7, ammonium sulfate buffer preservative as specified in method 3500-Cr to extend to 28 d HT	28 d	28 d
Copper by colorimetry	—*	—	g, c	—	—	
Mercury	P(A), G(A), FP(A)	500	g, c	Add HNO_3 to pH<2, Cool ≤6°C	28 d	28 d
Nitrogen						
Ammonia	P, G, FP	500	g, c	Analyze as soon as possible or add H_2SO_4 to pH<2, Cool, ≤6°C	7 d	28 d
Nitrate	P, G, FP	100	g, c	Analyze as soon as possible; Cool, ≤6°C	48 h	48 h (14 d for chlorinated samples)
Nitrate + nitrite	P, G, FP	200	g, c	Add H_2SO_4 to pH<2, Cool, ≤6°C	1–2 d	28 d
Nitrite	P, G, FP	100	g, c	Analyze as soon as possible; Cool, ≤6°C	none	48 h
Organic, Kjeldahl	P, G, FP	500	g, c	Cool, ≤6°C, add H_2SO_4 to pH<2	7 d	28 d
Odor	G	500	g	Analyze as soon as possible; Cool ≤6°C	6 h	24 h (EPA Manual drinking water)
Oil and grease	G, wide-mouth calibrated	1000	g	Add HCl or H_2SO_4 to pH<2, Cool, ≤6°C	28 d	28 d

TABLE 1060:I. CONT.

Determination	Container†	Minimum Sample Size *mL*	Sample Type‡	Preservation§	Maximum Storage Recommended	Regulatory‖
Organic Compounds						
MBAS	P, G, FP	250	g, c	Cool, ≤6°C	48 h	48 h as per CFR 136
Pesticides*	G(S), PTFE-lined cap	1000	g, c	Cool, ≤6°C, add 1000 mg ascorbic acid/L if residual chlorine present (0.008 % sodium thiosulfate in CFR 136)	7 d	7 d until extraction; 40 d after extraction
Phenols	P, G, PTFE-lined cap	500	g, c	Cool, ≤6°C, add H_2SO_4 to pH<2	*	28 d until extraction, 2 d after extraction
Purgeables* by purge and trap	G, PTFE-lined cap	2×40	g	Cool, ≤6°C; add HCl to pH<2; add 1000 mg ascorbic acid/L if residual chlorine present (0.008% sodium thiosulfate in CFR 136)	7 d	14 d
Base/neutrals & acids	G(S) amber	1000	g, c	Cool, ≤6°C, 0.008% sodium thiosulfate in CFR 136 if chlorine is present	7 d	7 d until extraction; 40 d after extraction
Oxygen, dissolved	G, BOD bottle	300	g			
Electrode				Analyze immediately	0.25 h	0.25 h
Winkler				Titration may be delayed after acidification	8 h	8 h
Ozone	G	1000	g	Analyze immediately	0.25 h	N.S.
pH	P, G	50	g	Analyze immediately	0.25 h	0.25 h
Phosphate	G(A)	100	g	For dissolved phosphate filter immediately; Cool, ≤6°C	48 h	48 h as per EPA manual for DW
Phosphorus, total	P, G, FP	100	g, c	Add H_2SO_4 to pH<2 and cool, ≤6°C	28 d	28 d
Salinity	G, wax seal	240	g	Analyze immediately or use wax seal	6 months	N.S.
Silica	F, P (PTFE) or quartz	200	g, c	Cool, ≤6°C, do not freeze	28 d	28 d
Sludge digester gas	G, gas bottle	—	g	—	N.S.	
Solids[9]	P, G	200	g, c	Cool, ≤6°C	7 d	2–7 d; see cited reference
Sulfate	P, G, FP	100	g, c	Cool, ≤6°C	28 d	28 d
Sulfide	P, G, FP	100	g, c	Cool, ≤6°C; add 4 drops 2*N* zinc acetate/100 mL; add NaOH to pH>9	28 d	7 d
Temperature	P, G, FP	—	g	Analyze immediately	0.25 h	0.25 h
Turbidity	P, G, FP	100	g, c	Analyze same day; store in dark up to 24 h, Cool, ≤6°C	24 h	48 h

* For determinations not listed, use glass or plastic containers; preferably refrigerate during storage and analyze as soon as possible.

† P = plastic (polyethylene or equivalent); G = glass; G(A) or P(A) = rinsed with 1 + 1 HNO_3; G(B) = glass, borosilicate; G(S) = glass, rinsed with organic solvents or baked; FP = fluoropolymer (polytetrafluoroethylene (PTFE, Teflon) or other fluoropolymer

‡ g = grab; c = composite.

§ Cool = storage at, >0°C, ≤6°C (above freezing point of water); in the dark; analyze immediately = analyze usually within 15 min of sample collection.

‖ See citation[10] for possible differences regarding container and preservation requirements. N.S. = not stated in cited reference; stat = no storage allowed; analyze immediately (within 15 min).

Some drinking water (DW) and treated wastewater (WW) matrices may be subject to positive interference as a result of preservation. If such interference is demonstrable, samples should be analyzed as soon as possible without preservation. Do not hold for more than 15 minutes without demonstrating that cyanide (CN) is stable for longer periods in a specific matrix.

NOTE: This table is intended for guidance only. If there is a discrepancy between this table and the method, the information in the current method takes precedence. If performing the method for compliance purposes, be aware that alternative preservation and holding-time requirements may exist. If so, the regulatory requirements should be used.