



Collecting & Handling Water and Wastewater Samples

A popular saying in the computer field is “garbage in - garbage out.” Analytical results are no different. Laboratory data results can only be as good as the sample on which the testing is performed. Therefore, the ability to produce credible, defensible analytical data begins at sample acquisition.

A variety of acceptable sample collection procedures exist for water and wastewater, making it extremely difficult to devise a universally accepted method. However, three objectives must be met when collecting samples, regardless of the sample method used:

1. Quantity - The sample must be of sufficient quantity to perform the required analytical testing.
2. Quality - Strict sampling and handling procedures must be followed that will not compromise the integrity of the sample either through sample deterioration or contamination.
3. Relativity - The sample must be a true representation of the source.



Field Technician collecting an industrial discharge from a manhole.

To successfully meet the challenge of obtaining a sample representative of the source, it is important to know how and when to collect samples. Depending on the analysis to be completed, the sampling procedure may be a simple grab sample taken from a single monitoring point or collection of multiple sub-samples from one or more points over a specified period of time. If sampling is being done for regulatory compliance, the monitoring method and frequency are dictated by permit specifications.

Prior to sampling, consultation with an environmental professional who is knowledgeable about sample acquisition and permit specification interpretation is recommended.

Sample Collection Guidelines

Space is not available to describe in full detail proper sampling methods and techniques. The following factors are important to consider when collecting water or wastewater samples. Anytime questions arise about proper sampling techniques or sample handling, consultation should be made with a qualified professional. Precautions taken before sampling may save valuable time and resources. Incorrect sampling can render the analytical data suspect, necessitating re-sampling and retesting.

General guidelines for collection of water and wastewater samples:

1. Some analytes can be biased if they come in contact with glass or plastic. Use only the recommended sample container and preservation method for each type of constituent being analyzed.
2. Prior to sampling, equipment and supplies (autosamplers, pumps, probes, sample containers) must be clean to ensure sample integrity.
3. A thorough understanding of permit specifications, regulations and / or ordinances is a strong foundation for monitoring compliance.

Guidelines for collection of drinking water samples:

1. Flush distribution system lines sufficiently to insure the sample collected represents the supply. If the goal of analytical testing is identifying constituents within the line system, flushing should not be done prior to sample acquisition.
2. When collecting groundwater samples from wells, purge the well sufficiently so the sample represents the groundwater source.
3. When samples are collected from a river or stream, observe the depth, stream flow and distance from the shore. If available, use equipment that allows an integrated sample collection procedure so that samples are collected according to flow.
4. Lakes and reservoirs are subject to seasonal changes. The location, depth and frequency of sampling should be based on the analysis to be completed.

Guidelines for collection of wastewater samples:

1. When compositing samples, proper precautions must be taken to avoid sample degradation from improper handling.
2. Constituents within the sample can be biased if the sample is collected in a turbulent area. Bias can also be a factor when sampling from weirs where compounds that are lighter than water may be present.
3. When utilizing the grab method of sample collection, the sample collected is only representative of the source at the time and location from which it came.



Sample Identification and Tracking

Once a sample has been collected, specialized procedures are necessary to properly identify and track it. Listed below are several important aspects to consider when transferring samples from the source location to the laboratory.

- Each sample requires an identification label. Adhesive labels or tags are commonly used and contain pertinent sample information such as client name, sample date, time, and location, analytical test required, and sample preservative. This information must be complete and correlate to the chain of custody record accompanying the sample.
- A Field Chain of Custody (see illustration below) is a record documenting who has handled a sample from the time it was taken until it arrives at the laboratory. The information contained on it includes at a minimum:
 - Sample identification
 - Analytes to be tested
 - Signature of the sample collector
 - Date and time of sample collection
 - Signatures of all persons handling the sample
- To detect and discourage sample tampering, custody seals can be placed on sample bottles. A seal that has been broken before arriving to the laboratory can easily be identified and investigated.


- To maintain constituent integrity, refrigerate or place the samples on ice immediately after the sampling event. Transport them to the laboratory as quickly as possible after collection. Note: Dry ice and ice pack products are not recommended for sample cooling.

Developing & Maintaining a Good Sampling Program

Each time a sample is taken, your sampling program is tested. To avoid re-sampling, retesting or questionable data, it is important to develop and maintain a sampling protocol and provide intermittent training and evaluation of sampling techniques. Sample credibility is fragile and can be compromised by something as simple as an incomplete chain of custody form. The professionals at McCoy & McCoy Laboratories, Inc. are available to develop an initial sampling program or enhance your current program. Sampling programs are tailored to the needs of your organization, focusing on regulatory compliance and accepted USEPA protocols. We offer staff training emphasizing safety, sampling accuracy, and written procedure documentation.

McCoy & McCoy Field Services

Many organizations simply cannot devote the resources needed to adequately develop and maintain a sampling program. As a full service laboratory, our Field Services Group provides complete, convenient, experienced sampling services. 

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Please print legibly CHAIN OF CUSTODY and ANALYTICAL REQUEST Bold Areas For MMLI Use Only Please							
Client:		Report to:		Bill To:		PO# _____ MMLI Quote # _____	
						Compliance Monitoring (check one)? Yes <input type="checkbox"/> No <input type="checkbox"/> Samples Chlorinated (check one)? Yes <input type="checkbox"/> No <input type="checkbox"/>	
Project Name	# OF CONTAINERS	MATRIX CODE (See Right)	PRESERVATIVE CODE (See Right)	MATRIX CODES:	PRESERVATIVE CODES:	PWS ID#	
Collected by (Signature):				DW - Drinking Water SW - Sewer Sludge SO - Sewer Solids - Oil SL - Sludge	DW - Ground Water WW - Waste Water SU - Surface Water	NI - Nitric acid (HNO ₃) HA - Hydrobromic Acid (HBr) SI - Sulfuric Hydroperoxide (H ₂ O ₂) ST - Sodium Thiosulfate ZN - Zinc acetate	SA - Sulfuric Acid (H ₂ SO ₄) AC - 4°C AB - Acetic Acid ND - No preservation IS - Sodium sulfate
DATE	COLLECTION TIME (24 hr)			SAMPLE DESCRIPTION Composite samples indicate begin time, end time and temp (°C) at end time	SAMPLE ANALYSIS REQUESTED Method ID if known (i.e. 82608, 60108/7470A...)	SAMPLE REMARKS (i.e. composite, grab, field readings, corrosive...)	MMLI USE ONLY MMLI Sample ID#
Relinquished by: (Signature)		Received by: (Signature)		DATE	TIME (24 hr)	MMLI USE ONLY: CONDITIONS UPON RECEIPT (CIRCLE ONE) Sealed Coolant _____ °C Temp _____ N/A Ambient _____ N/A	Method of Shipment (circle one): UPS _____ FedEx _____ MMLI _____ Client _____ Logged in by: _____ Location: _____
Relinquished by: (Signature)		Received by: (Signature)		DATE	TIME (24 hr)	MMLI USE ONLY Custody seals present/intact? YES NO N/A Broken containers? _____ CDC agree with sample labels? _____ Correct containers for testing? _____ Headspace issues acceptable? _____ Holding time(s) acceptable? _____ Preservative pH's acceptable? _____ Was gel left unadjusted? _____ All samples listed on CDC received? _____ Samples properly preserved? _____ Client's sample documents received? _____ CDC been relinquished? _____ Are tests listed for each sample? _____	Follow up required (circle one): YES NO Client informed on: ____/____/____ Client Rep: _____ MMLI Rep: _____ Reviewed by: _____ Date: ____/____/____
Relinquished by: (Signature)		Received by: (Signature)		DATE	TIME (24 hr)		
Relinquished by: (Signature)		Received by: (Signature)		DATE	TIME (24 hr)		
1. Expedited TAT not available for all services, please call 2. Samples received unannounced with < 48 hours holding time remaining may be subject to rush surcharges. 3. Lab reserves the right to return unused portions of samples to client.							

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