



Standard Operating Procedure

Title: **Drinking Water Compliance Sampling Procedures**

Applicable Unit/Vs/Division			DWICU/DWS/WQD				
SOP ID	SOP-001	Revision No.	4	Date of Issue	06/11/2020	Expires	06/06/2021

1.0 PURPOSE, SCOPE, APPLICABILITY & QUALIFICATIONS

The objective of compliance sampling is that the samples will be representative of all contaminants of the system or source, and that the sample will be handled in so that no significant changes in composition will occur in transit to the ADHS certified laboratory.

This is the ADEQ recommended field sampling SOP available to be used by all Public Water Systems when generating data for use in determining compliance with the Drinking Water Rules (40 CFR §141).

2.0 FREQUENCY

This process should be used every time an ADEQ inspector takes samples in the field. It can also be used by Public Water System samplers each time a compliance sample is taken.

3.0 HEALTH AND SAFETY

Refer to the Water Quality Division Safe Drinking Water “Health and Safety Guidelines”.

4.0 SUMMARY OF METHOD /PRINCIPLE

This Standard Operating procedure will cover proper steps to take while taking Drinking Water Compliance or Non-compliance samples. Using these sampling procedures will assist samplers in taking quality drinking water samples.

5.0 CAUTION

Follow sampling protocols that are listed in this Standard Operating Procedure, as well as following proper Personal Protective Equipment (PPE) protocol, aseptic techniques and any instructions from your designated environmental laboratory to avoid contamination issues or improper sampling techniques.

6.0 INTERFERENCES

This process does not include any analysis, therefore this section is not applicable.

7.0 EQUIPMENT, SUPPLIES & RESOURCES

- a. Sample bottles should be provided by the Arizona certified laboratory of choice. Acids and Bases are used as preservation in many of the sample bottles associated with drinking water sampling. These preservatives can be dangerous and must be handled with care.
 - i. Travel Blanks should be used in Volatile Organic Chemical sampling or other sampling that the laboratory suggests should have a travel blank. Travel Blanks are to be kept together with the field samples, with the custody seals intact, to determine whether samples are contaminated during the transport process.
 - ii. Sample labels are important to prevent sample misidentification. Sample labels should at least include sample identifier, location, the analyte to be tested for, sample preservative, and the

Drinking Water Compliance Sampling Procedures

Document ID: SOP-001

Revision No.: 4.0

- sample collection date and time. If labels are not already on the sample bottle when received from the laboratory, make sure to complete the labels and affix them to the bottles. Sample label information should match the information provided on the Chain of Custody.
- b. Personal Protective Equipment (PPE) should be worn in accordance with the PWS's health and safety plan. This generally includes wearing gloves, eye protection, and closed toe shoes when taking water samples. These PPE both protect the sampler from the preservatives in the sample bottles (or being added to the sample bottles) and also the sample from outside influence. Pants and long sleeve shirts can also assist in the protection of the skin from the acid preservatives used.
 - c. Chain of Custody forms should be used when taking all water samples. The chain of custody is a legal document that ensures sample integrity from collection to data reporting. The purpose of this document is to track who has possession of and is handling the sample at all times. The Chain of Custody information should match the information provided on the sampling labels on each bottle. This helps the laboratory match the sample bottles to the correct Chain of Custody.
 - d. A Cooler/Ice Chest is needed for transport of the samples once they have been collected.
 - e. Ice is needed to keep the samples at the recommended temperature of $4^{\circ}\text{C} \pm 2^{\circ}\text{C}$. Wet ice is recommended over blue ice packs.
 - f. Optional, but recommended materials
 - i. Temperature Blanks are small bottles filled with tap water and are used to take the temperature of the samples in the cooler, so as not to disturb the actual samples.
 - ii. Zipper Bags can be used to ensure that samples are not contaminated by other samples or by the ice used in the transport cooler.
 - iii. Custody Seals can be used to deter unauthorized tampering of samples. If you chose to use custody seals, attach the seal around the lid of the containers in such a way that it is necessary to break the seal in order to open the container.
 - iv. Bubble wrap or Bubble bags can be used to ensure that any glass sampling containers are kept safe and avoid breakage during transportation.
 - v. Sampling Plans are required for most, if not all, of the distribution sampling. It is recommended that the sampling plans are present during sampling to make sure that the samples are taken in the correct (approved) locations and the appropriate times.

8.0 PROCEDURES

1. Sampling Steps

- a. Distribution System Samples – all distribution system samples should have a sampling plan on file with the Public Water System. Please review this and/or take it with you when sampling to ensure the samples are taken at the correct time and location for compliance purposes.
 - i. Prepare your sampling area. This includes cleaning the area and the sample tap, and removing the aerator for any Total Coliform bacteria sampling in the distribution system.
 - ii. Put on your PPE.
 - iii. It is good practice to disinfect the sample tap prior to sampling. This can be done with isopropyl alcohol, hypochlorite, or another bleach solution. **IF YOU ARE SAMPLING FOR LEAD AND COPPER SKIP THIS STEP!**
 - iv. Flush the tap fully open for approximately 5 minutes (make sure you can no longer smell the disinfectant, if used) before returning the stream of water to the width of a pencil to fill the sample bottle. **IF YOU ARE SAMPLING FOR LEAD AND COPPER SKIP THIS STEP!**
 - v. Chose the correct sample bottle. Check with your laboratory if you are uncertain regarding the appropriate bottle type and preservative for the analyte.

Drinking Water Compliance Sampling Procedures

Document ID: SOP-001

Revision No.: 4.0

- vi. Remove the sample bottle top, including any shrink wrap if applicable. The bottle top should be kept in your hand or placed facing upwards so that the portion of the cap that touches the bottle does not touch the surface. If you hold the top in your hand, make sure to not let anything touch the inside of the cap or the rim.
 - vii. If the sample bottle is unpreserved you may rinse the bottle with the water a few times before filling the bottle, except with Lead and Copper sampling as these sample must be “first-draw”. If the sample bottle contains preservative DO NOT rinse the bottle. Do not touch the preservative or the inside of the bottle.
 - viii. If using unpreserved bottles, add preservative if directed to do so by the laboratory sampling instructions.
 - ix. Fill the sample bottle leaving air space of approximately 1% to provide the laboratory room to homogenize the sample prior to analysis. For Total Coliform bacteria sample make sure that there is at least 100mL in the sample bottle. For TTHM samples, DO NOT leave any headspace (air bubbles). Follow any direction provided to you by your laboratory.
 - x. Carefully place and tighten the top back on the sample bottle.
 - xi. Write the sample location, sample date and sample time on the sample label and place on the bottle.
- b. Entry Point to the Distribution System (EPDS) Samples
- i. Put on your PPE.
 - ii. Prepare your sampling area. This includes cleaning the area and the sample tap.
 - iii. Chose the correct sample bottle. Check with your laboratory if you are uncertain.
 - iv. Flush the tap for a length of time based on the pipe diameter, distance to the main and flow rate to acquire a representative sample, or for 5 minutes before returning the stream of water to a flow slow enough to fill the sample bottle without creating any splash back.
 - v. Remove the sample bottle top, including any shrink wrap. The bottle top should be kept in your hand or placed facing upwards so that the portion of the cap that touches the bottle does not touch the surface. You may also hold the top in your hand, making sure to not let anything touch the inside of the cap or the rim.
 - vi. If the sample bottle is unpreserved you may rinse the bottle with the water a few times before filling the bottle. If the sample bottle contains and type of preservative DO NOT rinse the bottle. Do not touch the preservative or inside of the bottle.
 - vii. If using unpreserved bottles, add any preservative if directed to do so by the laboratory sampling instructions.
 - viii. Fill the sample bottle leaving air space of approximately 1% to provide the laboratory room to homogenize the sample prior to analysis. For volatile organic compound samples DO NOT leave any headspace.
 - ix. Place the top back on the sample bottle.
 - x. Write the sample identification number, location, analyte, and sample date and sample time on the sample label and place on the bottle.
- 2. Labeling/Completing the Chain of Custody**
- a. Complete the Chain of Custody record for each sample. The form should include at least the sample location, sample date, sample time, and analyses requested. The signature of the persons relinquishing the samples and receiving the samples, along with the date and time of sample transfer, should be completed at each hand off of the samples.
 - b. If the sample is for compliance that must be indicated on the chain of custody prior to the sample being analyzed by the laboratory. Check your lab’s Chain of Custody, if there is not a location specified for you

Drinking Water Compliance Sampling Procedures

Document ID: SOP-001

Revision No.: 4.0

to indicate whether the sample is for compliance or not, write on the form whether it is for compliance or not for compliance (special purpose sample).

- c. This form is a legal document and as such should be completed as accurately as possible.

3. Transport to the Laboratory

- a. Place the sample bottles and completed/signed chain of custody in the cooler/ice chest. If the Chain of Custody will be transported inside the cooler with the samples, place it in a zipper bag to prevent it from getting wet and keep the ink from running while in the cooler.
- b. Nearly all of the drinking water compliance sample methods require samples to be kept at 2° - 10°C. If you are sampling in the summer months, or your certified laboratory is in the Southern half of the state, it is strongly recommended that you use “wet ice” as opposed to the blue ice packs.
- c. If you are shipping samples to your lab, it is strongly recommended that you first line the cooler with plastic such as a trash bag, place a trash bag or large plastic bag in the cooler prior to adding the samples and ice. It is recommended to use zipper bags to double bag your ice prior to placing it in the cooler with your samples to prevent melted ice from coming into contact with the sample containers and prevent leakage of water from the cooler. If the cooler starts leaking in transit, many shipping companies will hold the packages and open them to ensure that there are no hazardous materials leaking out. This could significantly delay your samples and possibly cause them to exceed the holding time.
- d. Ensure that the transport to the lab accounts for all hold times of the analyses that are being requested.
- e. When dropping off samples at a laboratory, be cautious when removing sample jars from the cooler. Wear appropriate PPE.
- f. Sample jars may break during transit.
- g. Do not lean on the laboratory sample counter to avoid contact with unknown chemicals

9.0 DATA AND RECORDS MANAGEMENT

It is good practice to keep a copy of your signed Chain of Custody in your records. Laboratory reports including QC data is sent to the PWS. The systems are required by 40 CFR §141.33 to retain on its premises or at a convenient location nearby, microbiological and turbidity analytical data for no less than 5 years, and chemical data no less than 10 years.

10.0 QUALITY CONTROL AND QUALITY ASSURANCE

The drinking water regulations (40 CFR §141) does not prescribe the use of quality control samples, such as duplicates or travel blanks, for drinking water compliance sampling. However, PWSs can take and utilize these samples if they wish.

Systems have the option to take split samples of any samples taken during a sanitary survey or a special investigation by the Drinking Water field staff. Any of these samples that are not field tests will be taken to one of the Arizona certified labs (see Attachment) and all relevant quality control measures will be taken by the certified lab.

11.0 MAINTENANCE ACTIVITIES

If sample bottles are stored by the sampler in anticipation of sampling events, make sure that samples bottles are kept in a cool and dry area until the bottles are used.

Drinking Water Compliance Sampling Procedures

Document ID: SOP-001

Revision No.: 4.0

12.0 TROUBLESHOOTING

Do not use sample bottles that appear to be discolored, dusty, or structurally compromised. When in doubt get new sample bottles from the laboratory.

If the sampler feels that something went wrong with the sampling event or the way the samples were handled at any time up until the laboratory takes custody of the samples, they are encouraged to re-take the sample using proper sampling procedures.

13.0 REFERENCES

Baird, Roger B., et al. "Standard Methods for the Examination of Water and Wastewater, 23rd Edition." 2017. Washington D.C. American Public Health Association, American Water Works Association, Water Environmental Federation.

EPA's *Quick Guide to Drinking Water Sample Collection*, November 2015, EPA R8 2nd edition.
<https://www.epa.gov/sites/production/files/2017-04/documents/quick-guide-drinking-water-sample-collection-2ed-update-508.pdf>.

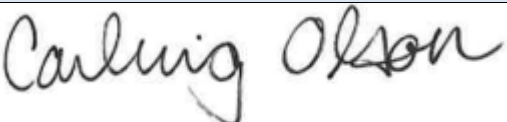
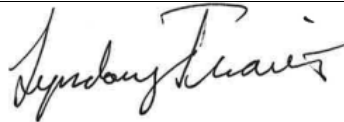

"National Primary Drinking Water Regulations." *Code of Federal Regulations*, Section Title 40, Chapter I, Subchapter D, Part 141. https://www.ecfr.gov/cgi-bin/text-idx?SID=a7b87dc7cb53f891cff96d2a89ac67f8&mc=true&tpl=/ecfrbrowse/Title40/40cfr141_main_02.tpl

14.0 ATTACHMENTS

Mandatory:

Attachment 1: Arizona Department of Health Services Certified Drinking Water Laboratory

15.0 DOCUMENT APPROVAL

Role	Name	Signature	Date
SOP Lead	Carling Olson		01/22/2019
Peer Reviewer	Lyndsey Travis		1/24/2019
Quality Assurance Manager	Paula Panzino		1/24/2019

16.0 REVISION HISTORY

Drinking Water Compliance Sampling Procedures

Document ID: SOP-001

Revision No.: 4.0

Revision Date	Author	Summary of Changes	Ref. Section
06/07/2019	C. Olson	Re-ordering sampling procedure section	Procedure
01/10/2020	C. Olson	Expanded Summary of method	Summary of Methods
06/11/2020	C. Olson	Procedures 3. e & f added	Procedure
1/6/2021	C. Olson	Minor formatting changes to Section 3	Transport to Laboratory

Drinking Water Compliance Sampling Procedures

Document ID: SOP-001

Revision No.: 4.0

ATTACHMENT 1: Arizona Department of Health Services Certified Drinking Water Laboratories

All compliance drinking water samples must be analyzed at a laboratory that has been certified by Arizona Department of Health Services (AZDHS). Below is a list of these laboratories as of 09/12/2018. This list will be updated every six months. The most current list updated by AZDHS can be found at: <https://app.azdhs.gov/BFS/LABS/ELBIS/DrinkingWaterTestingLabs/DrinkingWaterSearchContentPage.aspx>

LABNAME	CITY	STATE	PHONE
Mohave Environmental Labs	Bullhead City	AZ	(928) 754-8101
Radiation Safety Engineering, Inc.	Chandler	AZ	(480) 897-9459
Global Environmental Consulting, LLC	Concho	AZ	(928) 537-7755
Inner Basin Environmental, LLC	Flagstaff	AZ	928-440-5168
Nortest Analytical	Flagstaff	AZ	(928) 774-2312
Statewide Laboratory	Mesa	AZ	(480) 981-8859
Nestle Waters North America	Phoenix	AZ	(602) 547-3834
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Legend Technical Services of AZ, Inc.	Phoenix	AZ	(602) 324-6103
Aerobiology Laboratory Associates Inc.	Phoenix	AZ	(602) 441-3700
Inter Ag Services	Phoenix	AZ	(602) 273-7248
Motzz Laboratory, Inc.	Phoenix	AZ	(602) 454-2376
TestAmerica Laboratories, Inc.	Phoenix	AZ	(602) 437-3340
Fiberquant Analytical Services	Phoenix	AZ	(602) 276-6139
Bradshaw Mountain Environmental Inc.	Prescott Valley	AZ	(928) 778-4510

Drinking Water Compliance Sampling Procedures

Document ID: SOP-001

Revision No.: 4.0

Aquatic Consulting & Testing, Inc.	Tempe	AZ	(480) 921-8044
Apex Analytical Laboratory, LLC	Tempe	AZ	(602) 437-0762
XENCO Laboratories	Tempe	AZ	480-355-0900
Turner Laboratories, Inc.	Tucson	AZ	(520) 882-5880
Complete Analytical Services, LLC	Tucson	AZ	(520) 884-5811
Legend Technical Services, Inc.	Tucson	AZ	(520) 327-1234
Fresh Terra Services	Yuma	AZ	928 257-3601
Agri-Trend Lab & Consulting, Inc.	Yuma	AZ	(928) 317-0456
Enthalpy Analytical, LLC	Berkeley	CA	(510) 486-0900
TestAmerica	Irvine	CA	(949) 261-1022
Eurofins Eaton Analytical, LLC	Monrovia	CA	(626) 386-1100
EMAX Laboratories, Inc.	Torrance	CA	(310) 618-8889
Orange Coast Analytical, Inc.	Tustin	CA	(714) 832-0064
TestAmerica Sacramento	West Sacramento	CA	(916) 373-5600
ALS Environmental - Fort Collins	Fort Collins	CO	970 490-1511
ACZ Laboratories, Inc.	Steamboat Springs	CO	(970) 879-3590
SGS North America Inc. – Orlando	Orlando	FL	407-425-6700
Maxxam Analytics	Kennesaw	GA	(770) 499-7500
SVL Analytical, Inc.	Kellogg	ID	(208) 784-1258
Anatek Labs, Inc	Moscow	ID	208-883-2839

Drinking Water Compliance Sampling Procedures

Document ID: SOP-001

Revision No.: 4.0

Eurofins Eaton Analytical, LLC	South Bend	IN	(574) 233-4777
SGS North America Inc. – Scott	Scott	LA	337-237-4775
Northeast Laboratory Services	Winslow	ME	(800) 244-8378
National Testing Laboratories, LTD.	Ypsilanti	MI	(734) 483-8333
Pace Analytical Services, LLC.	Minneapolis	MN	(612) 607-1700
SGS North America Inc. – Dayton	Dayton	NJ	(732) 329-0200
Hall Environmental Analysis Laboratory, Inc.	Albuquerque	NM	(505) 345-3975
PACE Analytical Services, LLC - Pittsburgh PA	Greensburg	PA	724 850-5600
Eurofins Lancaster Laboratories Environmental, LLC	Lancaster	PA	(717) 656-2300
Environmental Science Corporation dba PACE Analytical National	Mt. Juliet	TN	(615) 758-5858
TestAmerica Laboratories, Inc	Nashville	TN	(615) 726-0177
Xenco Laboratory	Dallas	TX	(214) 902-0300
ALS Laboratory Group, Environmental	Houston	TX	(281) 530-5656
Xenco Laboratories	Stafford	TX	281-240-4200
EDGE Analytical, Inc	Burlington	WA	360-757-1400
ALS Environmental	Kelso	WA	(360) 577-7222
LAB / COR INC.	Seattle	WA	