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TITLE: PROCEDURE FOR COLLECTION, STORAGE, AND SHIPMENT OF STANDING TAP WATER SAMPLES FOR METALS AND ARSENIC BY EPA METHOD 200.8

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PROCEDURE FOR COLLECTION, STORAGE, AND SHIPMENT OF STANDING TAP WATER SAMPLES FOR METALS AND ARSENIC BY EPA METHOD 200.8

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1.0* SCOPE AND APPLICATION

The procedures described in this protocol are designed only to guide the collection, storage, and shipping of standing tap water samples to be analyzed by EPA Method 200.8 (version 4.4) during Phase I of the National Human Exposure Assessment Survey (NHEXAS). Standing tap water is the water that has been stored undisturbed inside of home plumbing for at least four hours prior to collection. Standing water samples are to be collected at the kitchen tap by a resident of the study home. The samples will be collected for total recoverable elements. The NHEXAS primary target analytes are lead and arsenic (Table 1). The secondary analytes are cadmium and chromium. This protocol describes the sample containers, sample collection, preservation, storage, shipping, and custody procedures.

2.0 SUMMARY OF THE METHOD

Sample containers will be prepared and shipped to the field site. The kitchen tap at each household will be identified. Participants (or alternative residents of the home) will receive verbal and written instructions for collecting the sample. Standing water samples will be collected only after a 4-hour period during which no plumbing fixtures in the home are used. The samples will be chilled at 1E to 6EC from the time of collection through the shipment to the analytical laboratory. All samples will be shipped to the analytical laboratory within seven days of collection. Completed custody records will be submitted with each sample. Nitric acid will be added to each sample upon receipt at the analytical laboratory.

Method Reference

EPA Method 200.8, Revision 4.4, April, 1991, U.S. EPA, Methods for the Determination of Metals in Environmental Samples, Office of Research and Development, Washington, D.C. (EPA/600/4-91/010).

3.0 SAMPLE COLLECTION MATERIALS

3.1 250 mL high density polyethylene bottles (Scientific Specialties Service, Inc. 233008, or equivalent).

3.2 Cooler

3.3 Ice packs (Cole Palmer L-06346-70 or equivalent)

3.4 Written instructions for sample collection.

4.0 PREPARATION OF MATERIALS

4.1 Bottles

4.1.1 Precleaning will be by the supplier under EPA protocol C (detergent wash, rinse with reagent grade water, Rinse with 1:1 nitric acid, rinse with reagent grade water, air-dried).

4.1.2 Alternatively, the bottles will be washed according to ACS/SOP-150-001, "Standard Cleaning Procedure for Cleaning Glassware/Plasticware" except tap water rinses will not be used; all rinses will be with deionized water only. Additionally, the bottles should not be oven dried.

4.1.3 Using a permanent marker, place a black line on the outside of the bottle indicating how full the bottle should be filled. The level line should be near the top of the bottle, but not on the neck.

5.0 SAMPLE COLLECTION

5.1 Have the participant identify their kitchen tap at the home. If there is no kitchen tap, then the sample should be collected from any other piped source. Standing water will be collected from the cold water supply in all homes. A second sample may be collected from the hot water supply in a small subset of homes.

5.2 Identify the person best suited to collect the water sample. This should be an adult that can wake up and collect the sample before any toilets, showers, taps, or other water outlets in the home are used. Alternatively, the sample may be collected at another time

provided that no water was used from any plumbing fixture (i.e., sinks, toilets, showers) during the preceding four hours.

5.3 Provide the identified person with written and verbal instructions on the sample collection procedure. An example of written instructions is provided in Figure 1. Perform a demonstration with the participant. Emphasize the importance of collecting the water before any other water use. Ask the identified person if they understand the instructions; repeat the instructions and demonstrations as necessary.

5.4 Identify the day on which the sample should be collected. Allow at least one extra day in case the sample was not collected on the specified day.

5.5 Do not remove any aerators, disconnect any filters present at the tap or bypass any water softening systems.

5.6 Collection of the Cold Supply Water Sample

5.6.1 Absolutely no water should be run from the tap prior to collecting the sample.

5.6.2 Turn on the tap to a low rate and begin collection with the first drop of water that flows from the tap.

5.6.3 Fill the sample bottle with at least 200 mL of water, do not pre-rinse.

5.6.4 Immediately cap the bottle and place in the refrigerator or cooler.

5.7 Collection of the Hot Supply Water Sample

Collection of conventional collocated standing water samples may not provide reliable precision data due to the unknown holding volumes and concentration gradients in home piping systems.

5.7.1 In lieu of collocated samples, a second standing water sample may be collected from the hot water tap in a small percentage of homes to assess potential difference in exposure from hot water supply lines (water that may be used to prepare food or hot drinks).

5.7.2 The participant will collect a hot water supply sample using procedures in 5.6 and the instructions in Figure 2.

5.8 Retrieval of Collected Samples

5.8.1 A field staff member will retrieve the collected sample(s) during a scheduled visit to the home.

5.8.2 The staff member will verbally confirm that the sample was collected only after home plumbing had been unused for four hours.

5.8.3 Sample collection information (Figure 3) will be entered into the collection record.

5.8.4 The sample will be returned to the field staging area for storage.

6.0 SAMPLE STORAGE AND SHIPMENT

6.1 Immediately after collection store the sample in the dark at 1E to 6EC.

6.2 The sample must be kept in the dark at 1E to 6EC at all times until analysis.

6.3 Prior to shipment, wrap electrical tape around the bottle cap so that it does not loosen during shipment.

6.4 Ship the sample to the analytical laboratory within seven days of collection.

6.5 Ship the sample in an insulated shipping container with sufficient cold packs so that the sample will remain cold for 24 hours.

NOTE: The sample must already be at 6EC or less when it is packed for shipment.

6.6 The sample should be shipped by an overnight carrier to the analysis lab.

7.0 QC PROCEDURES

7.1 Sample Code

7.1.1 A unique sample code must be assigned to each sample.

7.1.2 The sample container must have a label with a sample code identical to the code on the sample collection/custody record. The sample label must be secured by winding clear tape over the label and completely around the bottle.

7.2 Custody

7.2.1 Complete the sample collection information in the sample collection record when the sample is collected. The information needed in the sample collection record is presented in Figure 3.

7.2.2 Enter the collector ID and date collected in the appropriate fields in the collection record.

7.2.3 Print the custody record prior to shipping the sample and enclose the original custody record with the sample as it is shipped.

7.3 Quality Control Samples

7.3.1 Field Blanks

7.3.1.1 Field blanks are prepared to assess sample contamination from materials and methods.

7.3.1.2 Field blanks are prepared for a small percentage of the study homes to be defined in the QSIP.

7.3.1.3 Field blanks are prepared in the laboratory by adding contaminant-free water to a sample collection container.

7.3.1.4 Field blanks are shipped to the field site then taken to a participant's home and treated as a sample through storage and shipment to the analysis laboratory.

7.3.2 Collocated Sample Collection

7.3.2.1 Collocated samples will not be collected for standing water.

7.3.3 Field Controls

7.3.3.1 Field controls are prepared to assess recovery of target analytes through storage, shipment, and analysis.

7.3.3.2 Field controls are prepared for a small percentage of the study homes, to be defined in the QSIP.

7.3.3.3 Field controls are prepared by adding a known amount of the target analytes to contaminant free water in a sample collection container.

7.3.3.4 Field controls are shipped to the field site, then taken to a participant's home and treated as a sample through storage and shipment to the analysis laboratory.

WATER SAMPLE COLLECTION INSTRUCTIONS

WHEN TO COLLECT THE SAMPLE

1. We want to know what metals may be entering your water from the home plumbing. Therefore, it is very important that no water be withdrawn from any plumbing fixture (toilets, showers, faucets, others) in your home in the four hours before you collect the sample.
2. It will usually be most convenient to collect the sample immediately upon rising in the morning, but be sure that no one in the home has used any toilets, showers, or faucets before the sample is collected. You may collect the water sample during other times of the day provided no one has used any plumbing fixture during the previous four hours.
3. If water is used in your home before you collect the sample, please try again on the next day.

HOW TO COLLECT THE SAMPLE

1. The sample must be collected from the kitchen cold water tap.
2. Open the bottle (do not touch the inside of the container or lid).
3. Place the open bottle under the tap. It is important that you collect the first drop of water from the tap. Turn on the water and fill the bottle to the black mark on the side of the bottle.
4. Immediately screw the lid back onto the bottle. Do not open the container again.
5. Place the bottle in your refrigerator until it is picked up at the next visit.

Please fill in the following information:

DATE COLLECTED: _____

TIME COLLECTED: _____

WAS ANY WATER FROM A FAUCET, TOILET, SHOWER, OR OTHER TAP USED IN THE 4 HOURS BEFORE THE SAMPLE WAS COLLECTED?

YES _____ If YES, WHAT TIME WAS THE WATER USED _____

NO _____

Figure 1. Water sample collection instructions.

WATER SAMPLE COLLECTION INSTRUCTIONS
(Cold and Hot Water Supplies)

WHEN TO COLLECT THE SAMPLE

1. We want to know what metals may be entering your water from the home plumbing. Therefore, it is very important that no water be withdrawn from any plumbing fixture (toilets, showers, faucets, others) in your home in the four hours before you collect the sample.
2. It will usually be most convenient to collect the sample immediately upon rising in the morning, but be sure that no one in the home has used any toilets, showers, or faucets before the sample is collected. You may collect the water sample during other times of the day provided no one has used any plumbing fixture during the previous four hours.
3. If water is used in your home before you collect the sample, please try again on the next day.

HOW TO COLLECT THE SAMPLE

1. The first sample must be collected from the kitchen cold water tap.
2. Open the bottle (do not touch the inside of the container or lid).
3. Place the open bottle under the tap. It is important that you collect the first drop of water from the tap. Turn on the water and fill the bottle to the black mark on the side of the bottle.
4. Immediately screw the lid back onto the bottle. Do not open the container again.
5. Repeat Steps 2 and 3 for the kitchen hot water tap, using the second bottle that is labeled "HOT".
6. Place the bottles in your refrigerator until it is picked up at the next visit.
   Please fill in the following information:

   DATE COLLECTED: _____

   TIME COLLECTED: _____

   WAS ANY WATER FROM A FAUCET, TOILET, SHOWER, OR OTHER TAP USED IN THE 4 HOURS BEFORE THE SAMPLE WAS COLLECTED?

   YES _____ If YES, WHAT TIME WAS THE WATER USED _____

   NO _____

Figure 2. Water sample collection instructions.

SAMPLE TYPE:	Standing
SAMPLE CODE:	Same as label on container
PARTICIPANT ID:	Three digit participant i.d. number
COLLECTION DATE:	Date sample collected
COLLECTION TIME:	Time sample collected
COLLECTOR ID:	ID number of person that collected or picked up from participant
COLLECTION LOCATION:	Default = kitchen tap; revise for other location/source
TIME ELAPSED SINCE WATER USED:	Default = 4.0 hr; calculate and revise if participant reports water use in home during 4 hours prior to collection
PRESERVATIVE ADDED (FIELD):	Default = none
CHLORINE QUENCHER ADDED:	Default = none
COMMENT CODE:	Default = 0; change to 1 or 2 if a comment is added below
COMMENT:	Add text for any comments associated with this particular sample.

Figure 3. Information to be included on the sample collection record.

TABLE 1*. TARGET ANALYTES FOR NHEXAS PHASE I
STANDING WATER COLLECTION METHOD

Primary	Secondary	Others of Interest
Lead	Cadmium	Aluminum
Arsenic	Chromium	Barium
		Manganese
		Selenium
		Nickel

EXPLANATION OF REVISIONS

Revisions made 4/96; Denoted by *

General:

Arsenic was added as a target analyte. Revisions were made in the title, Section 1.0, and Table 1 to include arsenic. This revision was made because EPA decided to analyze all target analytes in one sample.