

Nebraska Department of Water, Energy, and Environment
Standard Operating Procedure (SOP)

Groundwater Division - GW

SOP Number: GW-100

Title: Groundwater Sample Preservation and Handling

Written Date: July 2025

Purpose: To preserve and handle ground water samples in a manner which meets laboratory requirements and which provides accurate groundwater quality results.

Equipment/Materials Needed:

- Ground water sample sets as per SOP # GW-060
- Nitric acid, concentrated, 2 ml vials
- Sulfuric acid, concentrated, 5 ml vials
- Disposable rubber gloves
- Eye protection (safety goggles or glasses, etc.)
- Coolers
- Ice to fill coolers
- Sample record sheets/laboratory request forms

Procedures:

1. Metals/major cations:
 - 1.1 Obtain and filter a sample (1 sample container, appropriately labeled and marked in green on label and cap) as per SOPs # GW-060 and 080.
 - 1.2 Obtain a vial containing 2 ml of concentrated nitric acid from its styrofoam container. Usually, the nitric acid vials are marked with an orange label. It's a good idea to mark the styrofoam container with a green mark (corresponds with the green mark on the sample container label and cap).
 - 1.3 CAREFULLY open the vial of concentrated nitric acid. CAUTION: Nitric acid is extremely corrosive and can cause immediate and serious skin or eye damage. It can also cause damage to clothing, equipment, etc. Use of disposable rubber gloves and eye protection is recommended. Also, when opening an acid vial, hold the vial at arm's length and downwind to lessen the chance of acid splashing on you. Finally, be sure to take notice of other people in the vicinity and open the vial away from them.
 - 1.4 Dispose of the top of the vial in a designated waste container as per SOP # GW-171.
 - 1.5 CAREFULLY add the nitric acid to the sample bottle marked with a green lid and label. The opening in the vial neck is quite small, so sometimes it's difficult to get the acid to come out of the vial. If this is the case, GENTLY tap the end of the vial against the sample container neck to help the acid drain from the vial. Again, it's a good idea to keep your face away from the vial and sample container as much as possible to lessen the chance of any splashing.
 - 1.6 After transferring all the acid from the vial to the sample, place the vial in one of the empty holes in the styrofoam packing in the vial container. Replace the styrofoam lid on the vial container and secure it for transport to the next sample site.

1.7 Cap the sample container tightly and shake it a few times to distribute the acid throughout the sample.

1.8 Place the sample on ice in the cooler.

2. Nitrates:

2.1 Obtain a sample (1 sample bottle, appropriately labeled and marked in yellow on cap and label) as per SOP # GW-060.

2.2 Obtain a vial containing 2 ml of concentrated sulfuric acid from its styrofoam container. Usually, the sulfuric acid vials are marked with a yellow label. It's a good idea to place a yellow mark on the styrofoam container (corresponds with the yellow mark on the sample container label and lid).

2.3 CAREFULLY open the vial of concentrated sulfuric acid. CAUTION: Sulfuric acid is extremely corrosive and can cause immediate and serious skin or eye damage. It can also cause damage to clothing, equipment, etc. Use of disposable rubber gloves and eye protection is recommended. Also, when opening an acid vial, hold the vial at arm's length and downwind to lessen the chance of acid splashing on you. Finally, be sure to take notice of other people in the vicinity, and open the vial away from them.

2.4 Dispose of the top of the vial in a designated waste container as per SOP # GW-171.

2.5 CAREFULLY add the sulfuric acid to the sample bottle marked with a yellow lid and label. The opening in the vial neck is quite small, so sometimes it's difficult to get the acid to come out of the vial. If this is the case, GENTLY tap the end of the vial against the sample container neck to help the acid drain from the vial. Again, it's a good idea to keep your face away from the vial and sample container as much as possible to lessen the chance of any splashing.

2.6 After transferring all the acid from the vial to the sample, place the vial in one of the empty holes in the styrofoam packing in the vial container. Replace the styrofoam lid on the vial container and secure it for transport to the next sample site.

2.7 Cap the sample container tightly and shake it a few times to distribute the acid throughout the sample.

2.8 Place the sample on ice in the cooler.

3. Major anions (except nitrate):

3.1 Obtain a sample (1 sample bottle, appropriately labeled with plain label and cap) with minimum air bubbles as per SOP # GW-060.

3.2 No added preservatives are necessary.

3.3 Place the sample on ice in a cooler.

4. Pesticides

4.1 Obtain a sample (1 l brown glass jar, appropriately labeled, with plastic cap and Teflon liner) as per SOP # GW-060.

4.2 Pesticide sample jars supplied by DHHS lab already contain a small amount of hydrochloric acid as preservative. Therefore, no added preservatives are necessary. BE SURE NOT TO RINSE THIS CONTAINER.

4.3. Place the sample on ice in a cooler.