DEPARTMENT OF HEALTH

Water Stable Isotopes

SAMPLE COLLECTION PROCEDURE

Read instructions carefully.
Follow all instructions to avoid sample rejection.

- **Sample bottle/preservative:**
  - Use two containers:
    - One 60 mL HDPE or PP plastic bottle, provided by a MDH Source Water Protection Hydrologist; and
    - One 125 mL or greater "general chemistry" HDPE bottle. This is used for field parameter measurement only.
  - No preservative needed.
- **Shipping:**
  - Keep samples from freezing to prevent rupturing the sample container.
  - Ship as soon as possible.
- **Sample location:**
  - The preferred sampling location is the source sampling tap nearest the wellhead.
    - Avoid sampling downstream of water treatment devices and large storage tanks if possible.
  - If no source sampling tap is available, the entry point sampling tap nearest the wellhead may be adequate if:
    - Sampled water is not a mixture of two or more source waters; and
    - No treatment of the sampled water occurs that might affect the isotopic content of the water (e.g., water heating, boiling, evaporation, or freezing processes).
  - Note any of the above sample location details in field notes.
- **Before collection:**
  - Have all well logs and site maps pertinent to the Public Water System site on hand when sampling.
    - Use this information to verify the well unique number, specifications, and locations prior to sampling.
    - Take notes on any new or conflicting information on well IDs or locations.
  - The intent is usually to sample water representative of pumping conditions.

  - Commonly, for high-capacity public water supply wells (wells that pump at greater than 20 gallons per minute or have a well diameter greater than 4 inches), running the pump for at least 10 minutes prior to sampling will adequately purge the well.
  - If the well is not normally used, purge it of at least three well volumes, if possible.
- Field parameters (temperature, pH, specific conductivity, dissolved oxygen, and Eh) are very important for scientific studies to better understand aquifer chemistry, but if no field measurement equipment is readily available, field parameter collection is not required.
- To collect field parameters for the sample, the following steps should be taken:
  - If available, attach field measurement equipment to the source sampling tap with a flow cell unit plumbed into the water stream.
  - Purge the well until temperature pH, dissolved oxygen, and Eh stabilize, ideally to within a range of 10% for three consecutive well volumes.
  - Record the specific conductivity, pH, dissolved oxygen, Eh, and temperature results in field notes and the appropriate fields in the "Tritium and Stable Isotopes Laboratory Request Form".
  - If you have received a partially completed Chain of Custody (COC) form with a sample bottle set, include your observations on the COC form.
  - Remove the field measurement equipment from the source sampling tap.

Sample collection procedure:

1. Attach the pre-printed label to the 60 mL bottle.
2. If you do not have a pre-printed label, use a ballpoint or permanent pen to write the following information on the blank bottle label:
   a. Public Water System ID (PWSID)
   b. PWS name
   c. Sample date and time
   d. Location name
   e. Well Unique Number or Source Water Protection-provided surface water site ID number. Contact the relevant SWP District Hydrologist if a surface water sample is needed.
   f. No other IDs (e.g., entry or source IDs) are permitted for water stable isotope samples.
   g. Collector name
3. Open the source sampling tap to allow a slow, steady water stream.
4. Remove the cap of the sample container.
5. Do not touch the underside of the cap or the inside of the sample container.

6. Position the sample container under the water flow.
7. Carefully fill the bottle to form a convex meniscus above the top of the bottle (the curved upper surface of a liquid formed by surface tension).
8. To do this, use the cap of the bottle to complete filling of the bottle.
9. Be sure to fill the container completely and avoid creating an air-filled headspace in the bottle.
10. If an air bubble larger than 6-10 mm (pinkie fingertip size) remains in the container, pour out water from the bottle and refill.
11. Samples will be rejected by MDH if a large air bubble remains in the bottle.
12. Fill the 125 ml bottle to be used for field parameter measurement. This bottle does not need to be filled with a meniscus, just to the shoulder.
13. Close the sampling tap.

Complete the laboratory request form using a ballpoint or permanent pen:

1. You **MUST** use Tritium and Stable Isotopes Laboratory Request Form (PDF) (https://www.health.state.mn.us/communities/environment/water/docs/sampproc/labrequestfill.pdf).
    a. If you are not an MDH employee, call 651-201-4700, or email health.drinkingwater@state.mn.us to obtain the form.
2. Fill out the Collector name, phone number, date, and time you collected the sample (include a.m. or p.m.), and the Unique Number or surface water sample ID.
3. If you have measured field parameters, please include those in the appropriate fields on the form.
4. Indicate that the sample has been collected for water stable isotope analysis by placing a check in the water stable isotope field.

Follow up on any new or conflicting location data:

1. Make note of any new or conflicting well locations by recording GPS locations and/or making notes on aerial photos.
    a. Note any discrepancies on any well unique number ID tags that are present on site.
    b. Photographs of well tags and well locations relative to large buildings can be great tools for this task.
2. Inform the Source Water Protection District Hydro (or whomever requested the sampling) if locations need to be changed or if there were problems with well identification in the field.
    a. Documentation of this required change must be shared with the District Hydro to support changes.
    b. The District Hydro will need to confirm the needed changes and input this data into the County Well Index database or any other databases (MNDWIS or WChem) as needed.

Deliver samples to the MDH St. Paul Freeman Building office:

1. No preservation is required.
2. Keep samples from freezing to prevent rupturing the sample containers.
3. Transport samples in a Styrofoam or small plastic cooler or well-padded cardboard box to prevent breakage.
4. All samples must have a completed "Tritium and Stable Isotopes Laboratory Request Form". No exceptions.
5. Dropping off or shipping samples:
    a. Deliver samples to the Isotope Lab Shipper (Arianna Giorgi) for office measurement of specific conductance and pH and shipment to contract laboratory.
    b. Laboratory method holding time is 6 months.
6. Shipping address:

Courier Service (Spee-Dee, UPS, FedEx, etc.)

Minnesota Department of Health
Drinking Water Protection
Attn: Isotope Lab Shipper (Arianna Giorgi)
625 Robert Street North
Saint Paul, MN 55155-2538

U.S. Postal Service – 1st Class

Minnesota Department of Health
Drinking Water Protection
Attn: Isotope Lab Shipper (Arianna Giorgi)
P.O. Box 64975
Saint Paul, MN 55164-0975

If you have questions, call 651-201-4700, or email health.drinkingwater@state.mn.us.

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3/2022 To obtain this information in a different format, call 651-201-4700.