Step-by-Step Instructions for PFAS Sampling

Overview and Objectives

These sampling instructions were developed to provide grant-funded technical assistance to public water systems (PWSs) who are collecting and analyzing drinking water well samples for per-and polyfluoroalkyl substances (PFAS) in disadvantaged and severely disadvantaged communities throughout California. PFAS analysis was required under a recent State Water Board Order DW 2024-0002-DDW (2024 Order). Sampling and laboratory analytical services are provided by the California State University, Sacramento Office of Water Programs (OWP), and partners (Geosyntec Consultants and Babcock Laboratories) at no cost to PWSs.

Some PWSs who received the 2024 Order and registered to receive free sampling and analytical services preferred to collect their own samples. These step-by-step instructions are provided to the PWSs approved by the State Water Board Division of Drinking Water (DDW) to perform the self-sampling and for their samplers. These instructions include an overview of the following sampling processes:

A. Preparing to sample;

B. Collecting the samples;

C. Shipping the samples; and,

D. Documentation and next steps.

Resources

Project-related information is housed on the **project website**: https://pfas.owp.csus.edu. If you have general questions about the project, **please contact OWP** at pfas@owp.csus.edu or 916.278.4483. You can access this information at OWP's website under "Contact Us".

If you have questions about the sampling process or sampling supplies, please contact your Geosyntec regional lead shown in the table below. Alternatively, you can contact Geosyntec's project manager, Elisabeth Hawley, at ehawley@geosyntec.com or 510.289.0521.

Table 1. Contact information for Geosyntec sampling team regional leads

Region	Contact	Phone	Email
North Coast	Maia Strait	(805) 979-9131	maia.strait@geosyntec.com
Central Valley/Sierras	Kathryn VonSydow	(805) 979-9178	katie.vonsydow@geosyntec.com
Fresno/Sierras	Zac Just	(559) 256-5868	zachary.just@geosyntec.com
SF Bay Area	Thom Henri	(510) 285-2767	thom.henri@geosyntec.com
Central Coast	Zoë Orandle	(805) 979-9156	zoe.orandle@geosyntec.com
Los Angeles Area	Delaney Todd	(714) 673-0788	dtodd@geosyntec.com
Riverside/San Diego	Alicia Fischer	(602) 513-5826	afischer@geosyntec.com

PFAS sampling in response to the 2024 Order is separate from and should not be confused with United States Environmental Protection Agency (EPA) sampling required under Unregulated Contaminant Monitoring Rule (UCMR) 5. **Your PWS may have additional PFAS sampling requirements under UCMR 5 that are not fulfilled by samples collected for the 2024 Order**.

- For this sampling program (2024 Order), sample kits will be shipped from Geosyntec Consultants. If grant team sampling is planned, Geosyntec will bring sample kits with them on the day of sampling.
- UCMR 5 sample bottles will be shipped from EPA.

Babcock Laboratories may be the same laboratory used for other PFAS monitoring requirements (including previous Order (DW 2022-0001-DDW) [2022 Order] sent by DDW). Bottles for those events will be shipped to you separately from your contract laboratory.

Please note that same-day shipping* in coolers well-packed with ice is critical for samples to stay cold until they arrive at the laboratory the next day. **If the temperature requirement is not met upon receipt by the laboratory, resampling will be required**. If running late on the day of sampling, we recommend holding samples in the cooler with ice overnight (keep between 1 and 6 degrees Celsius, but not frozen) and replenish with fresh ice before shipping the cooler out the next day, taking care not to ship samples to the laboratory for arrival on a weekend or holiday.

**Deadline for same-day shipping is typically 3 or 4 pm but may be as early as 1 or 2 pm in some parts of the state.*

A. Preparing to Sample

Step A1. Confirm the scheduled sampling date.

- To coordinate receiving samples from multiple PWSs and work within the laboratory's monthly sample capacity, the project team proposed a sampling date to each PWS.
- Your proposed sampling date will be communicated via email sent from OWP – please respond to the email to confirm your scheduled sampling date or, if necessary, alert the project team of an alternate planned date, ideally during the same week and preferably during the same month.
- You can also view your proposed or scheduled sampling date online by logging into the project website (Sign in at https://pfas.owp.csus.edu and view water system details).
- Coordinate and plan to collect samples on your scheduled date.

Step A2. Complete training requirements.

- Review the training video posted on the project website (Visit https://pfas.owp.csus.edu/resources).
- Review the *Quality Assurance Project Plan* posted under Resources on the project website.

Step A3. Review cooler contents and sampling supplies, once they arrive.

- You will receive coolers with sample bottles and other supplies approximately 1-2 weeks before the scheduled sampling date. A tracking number will be emailed to you once Geosyntec has shipped sample bottles and supplies.
- It is strongly recommended to wear a pair of disposable nitrile gloves when handling the sample bottles and sampling equipment to keep them clean.
- Your package will include self-sampling instructions, sample field forms, return shipping labels,[1, 2] pre-printed chain of custody forms, coolers with sample bottles, and sampling supplies.
- Sample bottles will be pre-labeled and organized in Ziploc® bags known as sample kits. Each sample kit contains bottles that will be filled at each well location. Some sample kits have more bottles to provide the laboratory with additional volume to analyze duplicates, matrix spike/matrix spike duplicates, or other analyses. For each well, a pre-printed chain of custody form identifies the sample kit designation (A through F). Depending on the sampling requirements and the number of wells to sample, you may not get a sample kit with every letter designation. You may also receive multiple sample kits with the same letter designation. Extra sample bottles and blank labels will also be provided. The laboratory will also provide you with bottles full of PFAS-free deionized water for use in collecting field blanks.
- Please keep the sample bottles together in the sample kit and do not mix them with sample bottles from other sample kits.
- Sampling supplies will be shipped to you, including powder-free nitrile gloves, coolers, plastic bags for ice and partially pre-filled chain of custody (COC) form (one form per well), Sample Field Form (one form per well), trash bag, spray bottle for hand washing, paper towels, shipping tape, and ballpoint pen. Use the ballpoint pen to complete sample labels, COC, and Sample Field Form(s).

Step A4. **Prepare and become familiar with sampling equipment.**

- You will need a camera or phone camera to take photographs of each well.
- If available, please plan to use a global positioning system (GPS) unit to record well latitude and longitude with sub-meter accuracy.

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[1] FedEx is the preferred shipping service for this project. However, if UPS is more conveniently located for shipping, please contact Geosyntec.

[2] Please note that FedEx's system does not allow us to pre-print return labels more than 1 week in advance of the scheduled shipping date. At the shipping center, the FedEx worker will re-print the return label with the correct shipping date to affix to the coolers. If coolers will be picked up from your office and your FedEx driver does not have the capability to re-print the label during pickup, please contact Geosyntec to confirm the shipping date and we can email you an updated pre-printed label with the correct shipping date.

- If available, please plan to use a water quality multi-meter that can be calibrated and used to measure turbidity, pH, conductivity, and water temperature.

Step A5. **Plan ahead for sample shipping.**

- Identify the closest location for shipping samples to Babcock Laboratory. PWSs located near Riverside, California may choose to drop samples off at the laboratory between the hours of 8:00am - 5:00pm, Monday through Friday.
- *Note that even if you have a laboratory who provided PFAS testing services to comply with a previously issued Order (2022 Order or UCMR5), Babcock Laboratories must be used for this sampling effort because of specialized tests that Babcock Laboratory has been performing under the oversight of DDW and EPA.*
- **Check shipping center hours and last pickup time for same day shipment and plan accordingly**. Samples cannot be left at Drop Box locations that do not have personnel onsite to accept the coolers. **Samples should not be dropped off past the deadline (typically 3 or 4 pm) for same-day pickup and shipping**. If same-day shipment of samples is not possible, samples will need to be stored in ice chests between 1 and 6 degrees Celsius, but **not frozen**, and shipped with fresh wet ice the next business day within Monday through Thursday shipping window. Do not ship coolers out on a Friday for Monday delivery -- If the cooler is held for an extra day or over the weekend by the shipping service, **samples WILL NOT ARRIVE within the required temperature for preservation, and resampling will be required**.
- Plan staff for sample collection. If two people are available, one can operate the well and collect the samples while the second person completes sample field forms, takes photos, and fills out COC forms and labels.
- Confirm that each well will be accessible and operable on the scheduled sampling date. If a well will not be accessible on the sampling date, please update the sampling date for the well information on the project website and request an alternate sampling date for that location. If a PWS has multiple wells and one well is unexpectedly unable to be sampled, please alert the project team as this may trigger collection of additional samples from another well (i.e., a change in kit type).
- *Note that for this project, samples should be collected from a sample port as close to the wellhead as possible, following at least 15 minutes of well operation. Plan to avoid collecting composite samples of water blended from multiple wells. If a wellhead is not accessible for sampling, please contact OWP and Geosyntec to set up an alternative sampling date for that location or to report a well as permanently inoperable so that it can be removed from the sampling program.*

Step A6. Plan ahead to reduce potential for cross-contamination on the day of sampling.

- Fill the vehicle with gasoline/fuel the day before sampling.

- Minimize the use of cosmetics, moisturizers, sunblocks,[3] insect repellants,[4] fragrances, creams, and other personal care products including hair products (unless they are known to be 100% natural or PFAS-free) on the day of sampling.
- On the day of sampling, avoid wearing new unwashed clothing, clothing washed with fabric softener, or clothing dried using anti-static dryer sheets. Avoid wearing synthetic water-resistant or stain-resistant clothing, or coated Tyvek® material. If it will be raining, plan to wear rain gear that is made of rubber, vinyl, or polyvinyl chloride and avoid wearing Gore-Tex®. You can note any exceptions to this on the daily field checklist.
- *Note: the training video features Geosyntec field staff wearing disposable PFAS-free boot covers. It is not necessary for PWS field samplers to wear PFAS-free boots or boot covers.*
- Plan ahead to avoid consuming food, beverages, or smoking in the sampling area. Paper packaging and fast-food wrappers may contain PFAS. Conduct these activities away from the sample area. Before returning to the sampling area, wash your hands.
- Avoid using equipment that is known to contain Teflon® or other fluoropolymers. It is not recommended to change sample port fittings to remove Teflon tape or polytetrafluoroethylene (PFTE) pipe thread sealant. Please note the presence of Teflon tape or pipe sealant, and the condition of the tape or sealant (e.g. discolored and frayed or new, white, and intact) in the comments section of the Sample Field Form. The presence of Teflon tape can also be documented in a photograph.
- Avoid using waterproof/treated paper and waterproof markers (such as Sharpies®) during sampling.
- It is recommended that the sampler wear safety glasses due to the presence of an ammonium acetate buffer in the EPA Method 533 sample bottles.

[3] Examples of PFAS-free sunscreens include Alba Organics Natural, Aubrey Organics, Banana Boat Sport Performance Sunscreen Lotion Broad Spectrum SPF 30, Banana Boat for Men Triple Defense Continuous Spray Sunscreen SPF 30, Banana Boat Sport Performance Coolzone Broad Spectrum SPF 30, Banana Boat Sport Performance Sunscreen Stick SPF 50, Coppertone Sunscreen Lotion Ultra Guard Broad Spectrum SPF 50, Coppertone Sport High-Performance AccuSpray Sunscreen SPF 30, Coppertone Sunscreen Stick Kids SPF 55, Jason Natural Sun Block, Kiss my Face, L'Oréal Silky Sheer Face Lotion 50+, Meijer Clear Zinc Sunscreen Lotion Broad Spectrum SPF 15, 30 and 50, Meijer Wet Skin Kids Sunscreen Continuous Spray Broad Spectrum SPF 70, Neutrogena Beach Defense Water + Sun Barrier Lotion SPF 70, Neutrogena Beach Defense Water+Sun Barrier Spray Broad Spectrum SPF 30, Neutrogena Pure & Free Baby Sunscreen Broad Spectrum SPF 60+, Neutrogena Ultra-Sheer Dry-Touch Sunscreen Broad Spectrum SPF 30, and Yes to Cucumbers.

[4] Examples of PFAS-free insect repellent include Jason Natural Quit Bugging Me, Repel Lemon Eucalyptus Insect repellant, Herbal Armor, California Baby Natural Bug Spray, BabyGanics, OFF! Deep Woods® spray for clothing and skin, Sawyer® do-it-yourself permethrin treatment for clothing, Insect Shield Insect® pretreated clothing, DEET products, and sunscreen/insect repellent combination product Avon Skin so Soft Bug Guard-SPF 30. Products with fluorinated ingredients (e.g., polyfluoroalkyl phosphate esters) should not be worn during sampling.

Step A7. Understand the types of samples in the sample kit and the order of collection at the well.

- Sample bottles are labeled with sample IDs that refer to the type of sample and the analytical method to be tested.
- The sample ID follow the format "PS Code _Identifying Letter_Analysis Code"
    - The Identifying Letter refers to the field sample (S), field duplicate (D), field blank (FB), or matrix spike/matrix spike duplicate (MSMSD)
    - The Analysis Code refers to EPA Method 533 (533), organofluorine analysis (AOF), or non-target PFAS using LC-HRMS and IC-MS/MS (QSM)
    - Sample ID Examples:
        - Well Sample: CA3610001_013_013_S_533
        - Field Duplicate Sample: CA3610001_013_013_D_533
        - Field Blank Sample: CA3610001_013_013_FB_533
        - Matrix Spike/Matrix Spike Duplicate Sample: CA3610001_013_013_MSMSD_533
- Please collect samples in the order listed on the COC. You may not have all the types of samples indicated above, but at a minimum, there will be the well samples and field blank samples. Field blank samples are listed at the top of the COC and will be collected first before collecting the samples at each well.

B. Collecting the Samples

Step B1. **Complete several activities at the start of the sampling day.**

- Discuss health and safety and review the day's tasks.
- If field equipment (e.g., a multi-meter) is available, calibrate and record calibration results on the day of sampling on the Sample Field Form.
- Pack coolers, bottles, and other sampling supplies in your vehicle.
- Purchase enough wet ice to fill the cooler accommodating for the size of the sample bottles planned to be collected and shipped.
- Fill Ziploc® bags with ice and place in the cooler.
- Complete the daily field checklist[5] and note any exceptions.

[5] The daily field checklist and daily field form are provided in the project *Quality Assurance Project Plan.* OWP will separately provide instructions for entering data electronically on the project website.

- Proceed to the first water supply well.

Step B2. Conduct purging and document conditions at the water supply well.

- Identify the sample port (refer to example photo) and turn on the well pump, if it is not already running. Allow the well to flush for at least 15 minutes before sample collection.
- If a multi-meter is being used, record multi-meter parameters at the tap including pH, conductivity, turbidity, and water temperature. Take 3 readings, 5 minutes apart and record each on the Sample Field Form and chain of custody form.
- If the water appears turbid, flush well another 5 minutes for a total purge time of 20 minutes. Note the total purge time if beyond the initial 15 minutes on the Sample Field Form in the comments section.
- If a GPS unit is available, record GPS coordinates.
- Take photographs of the well.
- Complete the Sample Field Form.

Example of a sample port location close to a well head, circled.

Step B3. Collect field blanks.

- Wash hands and wear power-free nitrile gloves.
- Collect field blanks as follows:
  1) Put on a fresh pair of powder-free nitrile gloves.
  2) From the sample kit, take out bottles with "FB" listed on the sample ID.
  3) Uncap the PFAS-free deionized water bottle and sample bottle.
     - **DO NOT** place the sample bottle cap on any surface while collecting the sample.
     - Avoid touching the inside of the sample bottle or cap.
  4) Pour PFAS-free deionized water into the field blank bottle.
  5) Recap the field blank bottle and place into a laboratory-provided sealed plastic bag and into the cooler.
  6) Complete the sample ID label by filling in sampler's initials and date and time of sample collection using a ball-point pen.
  7) Record information on the COC for that sample.
  8) Recap the empty PFAS-free deionized water bottle and place it into a Ziploc® bag.

Step B4. Collect water samples.

- Reduce the flow from sample tap to a laminar stream.
- Put on a fresh pair of powder-free nitrile gloves.
- From the sample kit, take out the remaining sample bottles.
  - Each sample ID consists of two bottles.
  - Multiple sample IDs may be required at the same location.
- Collect field samples as follows:
  1) Take out the first bottle and uncap it. Take the same precautions mentioned for field blanks to avoid contacting the inside of the sample bottle or bottle cap. Avoid contact with the sample port.
  2) Fill the sample bottle:
     - For the bottles not labeled for EPA Method 533 analysis, fill the sample bottle.
     - For the bottles labeled for EPA Method 533 analysis, preservative is present. Fill the sample bottle but DO NOT overfill since preservative could be flushed out of the bottle.

  - Bottles do not need to be headspace free. Because the laboratory will need to add additional reagent to the bottles, do not overfill the sample bottles.

3) Recap the bottle. If preservative is present, gently agitate the bottle by hand until the preservative is dissolved.

4) Complete the sample ID label by filling in sampler's initials and date and time of sample collection using a ball-point pen.

5) Record information on the chain of custody for that sample.

- Repeat Step B4 to fill the next bottle with the same sample ID.
- Repeat Step B4 to fill bottles for other sample IDs.
- Confirm that the sample date and time and analysis on the COC form corresponds to the information on the sample label for each bottle.
- Place the sample bottles into laboratory-provided sealed plastic bags and into the cooler.

Step B5. Check field form documentation and move to the next sample location.

- Check that Sample Field Form is complete.
- Move to the next location, wash hands, wear a fresh pair of gloves, and repeat the process to collect the field blank and samples.
- After collecting samples from all locations, remove gloves and discard into a trash bag, wash hands, and wear new nitrile gloves.

C. Shipping the Samples

Step C1. Pack the coolers.

- Place a layer of bagged wet ice in the bottom of the cooler.
- Place bagged samples upright in the ice chest.
- Fill the remaining space with bagged wet ice as much as possible to maintain a low temperature during shipping. This will also support the bottles during shipping.
- Note: **Samplers should check the shipping center hours and deadline for same day shipping (typically 3 or 4 pm) and plan accordingly**. Samples **CANNOT** be left at Drop Box locations that do not have personnel onsite to accept the coolers. Also, samples **CANNOT** be dropped off for shipping after the cutoff time for same day shipping. If same-day shipment of samples is not possible, samples should be held by the sampler and stored in ice chests between 6°C (42.8°F) and 0°C (32°F), but not frozen. Replenish fresh ice before packing and shipping the next day. **If coolers are left overnight with the shipping agency and shipped out the next day, or stored at the shipping agency over a holiday**

or weekend, the ice will melt. Samples WILL NOT ARRIVE within the required temperature for preservation, and samples will need to be re-collected.

Step C2. Drive to the shipping center.

- Verify that the COC forms are complete, sign, take a photo, and place it into a sealed plastic bag and place them inside the lid of each cooler.
- If available, adhere a FedEx pouch to the inside of the cooler lid, place the chain of custody inside the pouch, and seal the pouch.
- Close the cooler and secure the lid to the cooler base by wrapping shipping tape all the way around the cooler several times at both ends of the cooler.

Step C3. Ship the coolers.

- Use pre-paid FedEx forms and **Standard Overnight** delivery service to ship coolers to Allie Guerra, Babcock Laboratories, 6100 Quail Valley Court, Riverside, CA 92507, phone (951) 653-3351.
    - *Please note that FedEx's system does not allow us to pre-print return labels more than 1 week in advance of the scheduled shipping date. At the shipping center, the FedEx worker will re-print the return label with the correct shipping date to affix to the coolers. If coolers will be picked up from your office and your FedEx driver does not have the capability to re-print the label during pickup, please contact Geosyntec to confirm the shipping date and we can email you an updated pre-printed label with the correct shipping date.*
- Upload the tracking number for the shipment and copies of the chain of custody forms to the project website following instructions provided separately by OWP.

D. Documentation and Next Steps

Step D1. Check and share field documentation.

- Verify that forms are complete. If a paper field form was used, take a photograph or scan the field forms and include original forms with the chain of custody.
- Confirm that documentation was uploaded to the project website following instructions provided by OWP.

Step D2. Next steps

- Sample results will be provided to you by OWP or the State Water Board using a form letter and information packet on how to interpret results and next steps if PFAS are detected.
- It may take some time for the State Water Board to complete data integrity checks prior to sharing the results.

- As described in the 2024 Order, there may be actions that your PWS will need to take within 30 days of being notified of the analytical result (e.g., collection of confirmation samples, notification to the PWS's governing body or wholesale customers). For this reason, **please do not contact the laboratory to ask for results**.