Standard Operating Procedure (SOP)
Title: PFAS Sampling for EPA Method 537.1 and Method 200.7

Applicable Division/Program			Water Protection Division (WPD)/Emerging Contaminant Program (ECP)				
SOP ID	SOP-01 ECP-2025	**Revision No**	0	**Date Effective**	03/10/2025	**Annual review**	

DOCUMENT APPROVAL

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REVISION HISTORY

Dates	**Author**	**Summary of Changes**	**Ref. Section**

1. PURPOSE, SCOPE, APPLICABILITY & QUALIFICATIONS

The objective of this project is to collect drinking water samples at the Entry Point to the Distribution System (EPDS) and/or wellhead to screen for per- and polyfluoroalkyl substances (PFAS) using EPA Test Method 537.1, and lithium using EPA Method 200.7. The samples must be

handled appropriately so the integrity will not be compromised during collection, storage, shipment preparation, and transit to the certified laboratory.

This field sampling Standard Operating Procedure (SOP) is to be used by field staff and contractors collecting water samples for the ECP Regulated PFAS screening project using EPA Test Method 537.1 and lithium using EPA Method 200.7. PFAS samples are used for initial monitoring requirements of the PFAS National Primary Drinking Water Regulation (89 FR 32532).

2. FREQUENCY

This procedure should be followed each time ECP field staff and contractors collect water samples at Public Water Systems (PWSs) using EPA Method 537.1, and EPA Method 200.7

3. HEALTH AND SAFETY

Refer to the "National Primary Drinking Water Regulations - https://www.epa.gov/ground-water-and-drinking-water/national-primary-drinking-water-regulations" and Technical Factsheet for Lithium in Drinking Water.

4. SUMMARY OF METHOD /PRINCIPLE

This SOP covers proper steps while collecting compliance PFAS samples for analysis using EPA Method 537.1 and Method 200.7 for lithium. Note that two versions of Method 537.1 have been published (Shoemaker and Tettenhorst 2018, 2020). Either version of the Method is acceptable for compliance purposes (90 FR 4658).

Samples may be collected at the EPDS for initial monitoring requirements, and/or the source water location (wellhead, surface water intake, spring, etc.) for repeat sampling. Using these sampling procedures will assist samplers in collecting quality drinking water samples. All samples will be analyzed using EPA Test Method 537.1 and EPA Method 200.7 by a certified environmental laboratory (Attachment 1).

5. CAUTION

Follow sampling protocols that are listed in this standard operating procedure as well as proper personal protective equipment (PPE) protocol, aseptic techniques, and any instructions from your designated environmental laboratory to avoid contamination issues or improper sampling methods.

When dropping off samples at a laboratory, be cautious when removing sample containers from the cooler. Wear appropriate PPE. Sample containers may break during transit. Do not lean on the laboratory sample counter to avoid contact with unknown chemicals.

6. INTERFERENCES

Steps must be taken to avoid cross-contamination of all samples being collected. Refer to the Field Sampling Checklist (Attachment 2).

7. EQUIPMENT, SUPPLIES & RESOURCES

a. Sample containers are provided by a New Mexico certified laboratory.

For Method 200.7

Addition of preservatives is performed by the lab once samples are received. Samples must be returned to the laboratory within two weeks of collection.

For Method 537.1

These preservatives can be dangerous and must be handled with care. The safety data sheet (SDS) for the preservative Trishydroxymethylaminomethane Buffer (Trizma®) is included as Attachment 3.

Analyte	Method	Containers	Preservation	Maximum Holding Time
PFAS	EPA Method 537.1	250 mL high-density polyethylene (HDPE) container with HDPE screwcaps	1.4 g Trizma® per container Cool to 6°C or below	14 days

In the event that sample containers are unavailable from the lab, the following materials will be used for sample collection:

- 250 mL HDPE wide-mouth containers (e.g., Fisher Scientific #2104-0008)
- Trizma® (e.g., Sigma-Aldrich #T7193-250G)

b. Additional containers will be supplied for QA/QC samples including field reagent blank and duplicate samples.

c. Sample labels are important to prevent sample misidentification. Sample labels should include sample identifier (entry point to the distribution system (EPDS) or source name (e.g., Well #), location (Public Water System (PWS) name), analytical method and the sample preservative (Trizma® for PFAS samples). Preprinted labels are supplied by the lab. 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 container. Sample label information should match the information provided on the Chain of Custody (COC). Use a PFAS-free pen like a ball point pen and avoid markers like Sharpies and others that may contain PFAS compounds.

d. Personal protective equipment (PPE) must be worn in accordance with the public water system health and safety plan. This generally includes wearing gloves, eye protection, and closed toe shoes when taking water samples. Pants and long sleeve shirts can also protect the skin from the preservatives. PPE protects the sampler from the preservatives in the

sample container and protects the sample from outside contamination. Reference the Sampling Checklist (Attachment 2).

e. Chain of Custody (COC) forms must be used for all water samples. The COC is a legal document that ensures sample integrity from collection to data reporting. It tracks who is in possession of the sample at all times. The COC information should match the information provided on the sampling labels on each bottle including date and time. This helps the laboratory match the sample container to the correct chain of custody.

NMED ECP sampling staff may use the Secure Extranet Portal (SEP) application - drinking water sample collection to print the necessary COCs. When using the SEP to print a COC, the sampler will need to know what preservatives and container(s) are needed for each sample, A sample container and preservation quick reference guide can be found here. SEP-COC instructions are found at this link.

f. A cooler/ice chest is needed for transport of the samples once they have been collected. Ice is needed to keep the samples at the recommended temperature of $4^0 \pm 2^0$C. Wet ice is required, no blue ice packs. Wet ice is required for PFAS sampling because it is crucial to maintain a low sample temperature during collection and transport to the laboratory, preventing potential degradation of PFAS compounds, and because using "blue ice" or chemical ice packs, which can potentially contain PFAS contaminants, should be avoided; wet ice is considered a safer alternative in this regard.

g. Ziploc® Bags or equivalent PFAS-free bags must be used to ensure that samples are not contaminated by other samples or by the ice used in the cooler. Samples may be double-bagged using Ziploc® bags.

h. Seal the cooler properly by securely arranging the samples to prevent movement, applying PFAS-free tape to all seams, gaps, and openings, and adding a second layer of tape if needed to ensure extra security, particularly during rough handling or temperature extremes. After sealing, inspect the tape to ensure there are no air gaps or places where the seal could fail.

i. Two 5-gallon buckets are required to hold purge water when flushing sample taps inside well houses without drains.

8. PROCEDURES

a. Pre-Sampling Preparation

Site Assessment

- Review project scope and objectives for PFAS monitoring at drinking water entry points.

- Identify sampling points, such as entry points where treated water enters the distribution system.
- Obtain site maps, including locations of treatment plant(s) and sampling taps at entry points.
- Conduct a site visit to assess access, safety concerns, and sample point suitability.
- Confirm any operational restrictions (e.g., sampling during peak flow periods or after chemical treatments).

Health & Safety Plan (HASP)

- Ensure a health and safety plan is in place for the sampling team.
- Conduct a safety briefing for all personnel on-site regarding potential hazards (e.g., confined space, chemicals).
- Confirm that personal protective equipment (PPE) is available and appropriate (e.g., gloves, goggles, etc.). Ensure all equipment is PFAS-free.

Equipment Check

- Inspect and calibrate sampling equipment
- Ensure all sampling containers are PFAS-free
- Ensure containers are properly cleaned before use to prevent contamination.
- Confirm that only PFAS-free water is used for rinsing containers and equipment (use ultra-pure, PFAS-free water from a certified source).
- Ensure proper preservatives are available for PFAS analysis
- Prepare field documentation (chain-of-custody forms, sample labels, field logbooks, etc.).

Sampling Strategy

- Confirm the number of samples to be collected and the entry points selected.
- Determine whether any field blanks, trip blanks, or duplicates are needed.
- Verify that you are knowledgeable with proper sampling protocols.

b. Field Sampling Collection at Entry Points
Preparation

- Prior to arrival at the sampling location, review this Sampling Checklist to ensure precautions are taken to avoid cross-contamination of samples.

- Set up a clean and safe sampling area at the entry point to the distribution system.
- Prepare decontamination stations if necessary, particularly if using any reusable equipment.
- Only use clean, dedicated sampling equipment to avoid cross-contamination.
- Ensure that only PFAS-free water is used for rinsing equipment, containers, and tools.

Personal Precautions

- Thoroughly wash/rinse your hands with PFAS-free water and dry them before initiating sampling activities.
- Use a clean pair of nitrile gloves for sample collection at each sample location.

Pre-Sampling Preparation

All samples will be collected from a sample tap at the source or EPDS when practicable.

- When sampling at wellheads, ensure the pump has been running for at least 15 minutes prior to sampling.
- When sampling at the tap at the sample location, fully open it for approximately 5 minutes to ensure fresh water is collected and avoid residual contamination.

Sample Collection

- Check the label to ensure you are using the correct sample container.
- Remove the sample container cap and hold it facing upwards, ensuring that the inside of the cap or the rim does not touch any surface.
- The sample container has the preservative – DO NOT rinse the container. Do not touch the inside of the container or the preservative.
- Fill the sample container carefully without overfilling. Samples do not need to be collected headspace free.
- After collecting the sample, cap the container and agitate by hand until the preservative is fully dissolved. Keep the sample sealed from the time of collection until extraction.

Sample Documentation:

- Label the sample containers with the correct identifiers, including:
  - Sample ID

- Sampling location (entry point to the distribution system (EPDS) or source)
- Write the sample location, sample date, and sample time on the chain of custody.

Field Quality Control:

- Ensure field blanks, trip blanks, and duplicates are incorporated as follows for both PFAS and lithium samples:
  - One field reagent blank (FRB) per sampling event.
  - One field duplicate (FD) for every 20 samples (5%)

  Verify that field reagent blanks and trip blanks are correctly handled, sealed, and labeled. Reminder that EPA Method 200.7 does not require the sampler to use any reagents in the field.

  Field reagent blanks collected for Method 537.1 must use the preservative Trizma®. Pour the FRB at the sampling point at the time the sample is collected. One FRB will be poured during each sampling event and will be included as part of the sample shipment for laboratory analysis. Include the FRB on the chain of custody. Field reagent blanks will only be analyzed if there are detections of PFAS compounds in the sample. Instructions: open the included FRB sample and pour into one of the empty sample containers. Close the sample container, seal and label the container as FRB, place in a Ziploc bag, and place in the cooler. Record the FRB identification number on the COC form.

  Field sampling staff will collect field duplicate samples during the assessment. Field duplicate samples are collected simultaneously with a standard sample from the same source under identical conditions into separate sample containers. One FD for every 20 samples (five percent) collected will be analyzed for both PFAS and lithium samples.

- Verify that the sampling procedure adheres to the Emerging Contaminants Program standard operating procedure (SOP) for PFAS drinking water sampling.

Record Environmental Conditions:

- Record environmental conditions such as flow rate (if available), pH, TDS/specific conductivity, water temperature, and weather conditions at the time of sampling

Sample Handling and Transport

- **Chain of Custody:**

This form is a legal document and must be filled out as accurately and legibly as possible.

  - Complete a COC for each water sampling point. Include the name and number of the water system and document each field reagent blank and sample collected. Include details such as sample location, sample date, sample time, and analyses requested.
  - Ensure that the signature, date, and time of sample transfer are completed by both the person relinquishing and the person receiving the samples at each handoff.

- **Packing and Temperature Control:**

  - If the COC is transported inside the cooler with the samples, place it in a Ziploc® bag to prevent it from getting wet and ensure the ink does not run.
  - Place the sample container inside the Ziploc bag and the completed, signed COC in the cooler/ice chest.
  - Use wet ice (not blue ice packs) to maintain the temperature at 4°C ± 2°C. Ensure that ice is properly packed to keep the samples at the correct temperature throughout transport.

- **Sealing and Security:**

  Seal the cooler with PFAS-free tape to prevent unauthorized access during transport.

- **Transport Timing:**

  Transport/ship the samples to the laboratory within the required timeframe: 24 hours is required for PFAS analysis and two weeks for lithium analysis by Method 200.7. Coordinate with the laboratory when sampling occurs near weekends or holidays.

c. Post-Sampling Procedures

- **Post-Sampling Cleanup**
  - Decontaminate any reusable sampling equipment used (if applicable).
  - Properly dispose of any disposable materials used (e.g., gloves, wipes).
  - Dispose of any waste materials in accordance with applicable waste disposal regulations.
- **Field Documentation**
  - Ensure all field documentation is complete and accurate, including sample labels, COCs, and field logbooks.
  - Verify that all samples are documented correctly with matching labels and COC forms.

- **Data Review**
    - Review the field data and sample collection information for completeness and consistency with the sampling plan.
    - Cross-check sample data with sample IDs to ensure no discrepancies in labeling or handling.
- **Audit and Performance Review**
    - Conduct a debrief with the field team to discuss any challenges or issues that arose during the sampling event.
    - Review any sampling deviations or issues to identify opportunities for improvement.
    - Document and resolve any non-conformances to the sampling protocol.

d. Reporting

- **Laboratory Analysis**
    - Confirm that the laboratory has received the samples and the required COC documentation.
    - Ensure that the laboratory follows appropriate analytical methods Track the laboratory results and ensure they are received within the expected timeframe.
- **Data and Records Management**

The signed COC and laboratory reports including QC data will be kept electronically in a shared folder. Records management and retention shall be performed in accordance with the following policies: NMED Policy and Procedure 01-06 Inspection of Public Records Policy; NMED Policy and Procedure 05-02 Management of Electronic Records; Inspection of Public Records Act, NMSA 1978, §§14-2-1 *et seq.*; Management of Electronic Records Rule 1.13.3 NMAC; General Records Retention and Disposition Schedules Rule 1.15.2 NMAC; and Executive Records Retention and Disposition Schedules NMED Rule 1.18.667.

9. MAINTENANCE ACTIVITIES

The following are four key goals of maintenance activities:

- Minimize PFAS contamination in the sampling process, ensuring that all equipment is thoroughly cleaned, inspected, and maintained.
- Ensure proper functionality of all sampling and water collection equipment to collect accurate, uncontaminated samples.
- Extend the longevity of equipment and sampling containers through routine cleaning and maintenance.

- Provide consistent documentation and recordkeeping to track maintenance and equipment integrity over time.

Details

a. Equipment Maintenance

- **Routine Cleaning and Decontamination**
  - **Clean and decontaminate all sampling equipment** (e.g., pumps, tubing bailers) after each sampling event. Ensure that decontamination procedures prevent cross-contamination of PFAS.
  - **Use PFAS-free cleaning agents** and distilled water (free of PFAS) for cleaning equipment. Avoid harsh detergents or cleaners that may contain PFAS compounds.
  - **Inspect all sampling containers** for cracks. Replace damaged containers to ensure they remain free from contamination.
  - **Rinse all equipment with PFAS-free water** after cleaning and before use in subsequent sampling events to ensure no residual PFAS contamination remains.

  - Regularly **inspect all field tools** (e.g., spigots, container caps, lids) to confirm that they are PFAS-free

b. Storage and Handling of Sampling Containers

- **Proper Storage of Sampling Containers**
  - **Store sampling containers** in a clean, dry, and dedicated area away from any potential PFAS contamination sources (e.g., chemical storage areas, cleaning supplies).
  - **Use sealed containers or bags** for storage when not in use to ensure that the containers remain uncontaminated by ambient PFAS sources.
  - **Perform periodic checks on stored containers** to verify that there are no issues with integrity (e.g., cracks, improper sealing, or contamination).

- **Labeling and Stock Rotation**
  - Ensure all **PFAS-free sample containers** are properly labeled and rotated to ensure older containers are used first.

c. PFAS-free Water Supply Maintenance

- **Regular Testing of PFAS-free Water Supply**
  - Regularly **test your PFAS-free water source** to ensure it is free from PFAS contamination. This water is essential for rinsing equipment and cleaning containers.
  - **Record water quality tests** for PFAS contaminants in water used for sampling and decontamination, ensuring the water meets strict PFAS-free standards.

- **Storage and Handling of PFAS-free Water**
    - Store **PFAS-free water** in containers that are dedicated to this purpose and do not use containers that have been exposed to potential contamination sources.

d. Quality Control (QC) and Audit Maintenance

- **Field Reagent Blank Maintenance**
    - **Maintain FRB samples** (i.e., uncontaminated water) and perform regular checks to ensure that any potential contamination or issues with the sampling process are caught early.
    - Ensure **proper handling and storage of FRBs** to avoid inadvertent contamination.

- **Review of Sampling Procedures and Equipment**
    - Annually **audit sampling protocols** and review standard operating procedures (SOPs) to identify areas where maintenance may be needed or where improvements could be made to minimize contamination risk.
    - **Ensure annual refresher training, or training if anything changes in the procedure,** for field personnel on the maintenance procedures and handling of equipment to reduce human error and contamination risks.

e. Documentation and Recordkeeping

- **Maintenance Logs**

    - **Maintain detailed maintenance logs** for all sampling equipment, containers, and tools. Include records of inspections, decontamination activities, calibration, and any corrective actions taken.
    - **Log any issues** or challenges encountered during sampling, including equipment failures, contamination concerns, or changes in procedures to address specific maintenance needs.

- **Inventory Management**

    - **Track the lifespan** of PFAS-free equipment and containers, and replace them as needed to prevent degradation that could lead to contamination.

f. Preventative Maintenance for Long-Term Success

- **Regular Scheduled Maintenance**
    - Set up **a preventative maintenance schedule** for sampling equipment, including periodic inspections, cleaning, and decontamination procedures.
    - **Perform regular audits** of the entire sampling process and equipment storage to ensure that contamination risks are minimized, and that all equipment remains in good working condition.

10. TROUBLESHOOTING

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

If the sampling, handling, or transport of a sample was compromised in any way, do not use the sample. Instead, recollect the sample, if possible.

11. 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.

Shoemaker, JA., and D.R. Tettenhorst. “Method 537.1 Determination of Selected Per- and Polyfluorinated Alkyl Substances in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS) [Version 1.0].” 2018. EPA/600/R-18/352. United States Environmental Protection Agency, Office of Research Development.

Shoemaker, JA., and D.R. Tettenhorst. “Method 537.1 Determination of Selected Per- and Polyfluorinated Alkyl Substances in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS) [Version 2.0].” 2020. EPA/600/R-20/006. United States Environmental Protection Agency, Office of Research Development.

United States, Environmental Protection Agency. “Expedited Approval of Alternative Test Procedures for the Analysis of Contaminants Under the Safe Drinking Water Act; Analysis and Sampling Procedures.” 90 Fed. Reg. 4658 (Jan. 16, 2025).

U.S. EPA. 1994. “Method 200.7: Determination of Metals and Trace Elements in Water and Wastes by Inductively Coupled Plasma-Atomic Emission Spectrometry,” Revision 4.4. Cincinnati, OH. https://www.epa.gov/sites/default/files/2015-06/documents/epa-200.7.pdf

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-samplecollection-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/textidx?SID=a7b87dc7cb53f891cff96d2a89ac67f8&mc=true&tpl=/ecfrbrowse/Title40/40cfr1 41_main_02.tpl

Federal Register: PFAS National Primary Drinking Water Regulation https://www.federalregister.gov/documents/2024/04/26/2024-07773/pfas-national-primary-drinking-water-regulation

PFAS Analytical Methods Development and Sampling Research

https://www.epa.gov/water-research/pfas-analytical-methods-development-and-sampling-research

Quality Assurance Project Plan for Emerging Contaminants in Small and Disadvantaged Communities Program, 2025

12. ATTACHMENTS

Attachment 1: List of New Mexico Department of Environment (NMED) Certified Drinking Water Laboratories for EPA Method 537.1. and that can analyze using EPA Method 200.7.

Attachment 2: Field Sampling Checklist

Attachment 3: Safety data sheet for Trishydroxymethylaminomethane Buffer (Trizma®)

ATTACHMENTS

ATTACHMENT 1: New Mexico Environment Department - Drinking Water Bureau (DWB)

All PFAS drinking water samples must be analyzed at a laboratory that has been certified by NMED DWB. Below is a list of laboratories certified to analyze drinking water samples using EPA Method 537.1 . In addition, the lab should be able to enter PFAS data into the Safe Drinking Water Information System (SDWIS). This list will be updated as NMED DWB certifies additional laboratories for the test method.

LABNAME	LABORATORY CERTIFICATION #	CITY	STATE	PHONE
Anatek Labs Inc. - Moscow	ID00013	Moscow	ID	208-883-2839
Cardinal Laboratories	NM00036	Hobbs	NM	575-393-2326
EMSL Analytical	NJ00337	Cinnaminson	NJ	800-220-3675
Eurofins Environment Testing South Central (*formerly Hall Environmental*)	NM9425	Albuquerque	NM	505-345-3975
Eurofins Eaton Analytical – Pomona (*formerly Monrovia*)	CA00006	Pomona	CA	626-386-1100
Eurofins Eaton Analytical – South Bend	IN00035	South Bend	IN	574-233-4777
GEL Laboratories, LLC	SC00012	Charleston	SC	843-556-8171
NM SL – Scientific Laboratory	NM9424/NM00023	Albuquerque	NM	505-383-9000

NMED DWB does not currently certify laboratories for lithium analysis as it is not regulated in drinking water. It is recommended that lithium samples be submitted to laboratories that are certified for heavy metals analysis. Most of the PFAS-certified laboratories above are also certified for heavy metals analysis by Method 200.7; see the NMED DWB list of certified laboratories for more details.

ATTACHMENT 2: Field Sampling Checklist

Preparation

- ☐ Prior to arrival at the sampling location, review the Sampling SOP to ensure precautions are taken to avoid cross-contamination of samples.
- ☐ Set up a clean and safe sampling area at the entry point to the distribution system.
- ☐ Prepare decontamination stations if necessary.
- ☐ Only use clean, dedicated sampling equipment to avoid cross-contamination.
- ☐ Ensure that only PFAS-free water is used.

Personal Precautions

- ☐ Thoroughly wash/rinse your hands with PFAS-free water and dry them before initiating sampling activities.
- ☐ Use a clean pair of nitrile gloves for sample collection at each sample location.

Pre-Sampling Preparation

- ☐ All samples will be collected from a sample tap at the wellhead or EPDS when practicable.
- ☐ When sampling at the wellhead, ensure the pump has been running for at least 15 minutes prior to sampling.
- ☐ When sampling at the tap at the sample location, fully open it for approximately 5 minutes to ensure fresh water is collected and avoid residual contamination.

Sample Collection

- ☐ Check the label to ensure you are using the correct sample container.
- ☐ Remove the sample container cap and hold it facing upwards, ensuring that the inside of the cap or the rim does not touch any surface.

- The sample container has the preservative – DO NOT rinse the container. Do not touch the inside of the container or the preservative.
- Fill the sample container carefully without overfilling. Samples do not need to be collected headspace-free.
- After collecting the sample, cap the container and agitate by hand until the preservative is fully dissolved. Keep the sample sealed from the time of collection until extraction.

Sample Documentation

- Label the sample containers with the correct identifiers, including:
  - Sample ID
  - Sampling location (entry point to the distribution system or source)
  - Date and time of collection
  - Sampler's name and contact details
- Write the sample location, sample date, and sample time on the chain of custody.

Field Quality Control

- One field reagent blank will be collected per sampling event.
- OPTIONAL - One trip blank per sampling event.
- One field duplicate sample for every 20 samples (5%).

Record Environmental Conditions

- Flow rate
- Water temperature
- pH
- TDS/spec conditions
- Weather conditions at the time of sampling

Sample Handling and Transport

- **Chain of Custody:**
  - Complete a chain of custody for each water sampling point. Include the name and number of the water system and document each field reagent blank and sample collected. Include details such as sample location, sample date, sample time, and analyses requested.
  - Ensure that the signature, date, and time of sample transfer are completed by both the person relinquishing and the person receiving the samples at each handoff.
- **Packing and Temperature Control:**
  - If the Chain of Custody is transported inside the cooler with the samples, place it in a Ziploc® bag to prevent it from getting wet and ensure the ink does not run.
  - Place the sample container inside the Ziploc bag and the completed, signed chain of custody in the cooler/ice chest.
  - Use wet ice (not blue ice packs) to maintain the temperature at 4°C ± 2°C. Ensure that ice is properly packed to keep the samples at the correct temperature throughout transport.
- **Sealing and Security:**
  - Seal the cooler with PFAS-free tape to prevent unauthorized access during transport.
- **Transport Timing:**
  - Transport/ship the samples to the laboratory within 24 hours. Coordinate with the laboratory on shipping samples collected near weekends or holidays.

ATTACHMENT 3: Safety data sheet for Trishydroxymethylaminomethane Buffer (Trizma®)

SAFETY DATA SHEET

1. Identification

Product identifier	**TRISHYDROXYMETHYLAMINOMETHANE BUFFER, pH 7.0**	
Other means of identification		
Product code	5804	
Recommended use	professional, scientific and technical activities: other professional, scientific and technical activities	
Recommended restrictions	None known.	
Manufacturer/Importer/Supplier/Distributor information		
Manufacturer		
Company name	GFS Chemicals, Inc.	
Address	800 Kaderly Drive Columbus, OH 43228 United States	
Telephone	Phone Toll Free Fax	740-881-5501 800-858-9682 740-881-5989
Website	www.gfschemicals.com	
E-mail	service@gfschemicals.com	
Emergency phone number	Emergency Assistance	Chemtrec 800-424-9300

2. Hazard(s) identification

Physical hazards	Not classified.
Health hazards	Not classified.
Environmental hazards	Not classified.
OSHA defined hazards	Not classified.
Label elements	
Hazard symbol	None.
Signal word	None.
Hazard statement	The mixture does not meet the criteria for classification.
Precautionary statement	
Prevention	Observe good industrial hygiene practices.
Response	Wash hands after handling.
Storage	Store away from incompatible materials.
Disposal	Dispose of waste and residues in accordance with local authority requirements.
Hazard(s) not otherwise classified (HNOC)	None known.
Supplemental information	93.9% of the mixture consists of component(s) of unknown acute oral toxicity. 100% of the mixture consists of component(s) of unknown acute dermal toxicity. 100% of the mixture consists of component(s) of unknown acute hazards to the aquatic environment. 100% of the mixture consists of component(s) of unknown long-term hazards to the aquatic environment.

3. Composition/information on ingredients

Mixtures

Chemical name	Common name and synonyms	CAS number	%
TRISHYDROXYMETHYLAMINOMETHANE HYDROCHLORIDE	TRIS HYDROCHLORIDE TROMETHAMINE HYDROCHLORIDE	1185-53-1	93.9
TRISHYDROXYMETHYLAMINOMETHANE	TRIS THAM TROMETHAMINE 2-AMINO-2-HYDROXYMETHYL-1,3-PROPANEDIOL	77-86-1	6.1

*Designates that a specific chemical identity and/or percentage of composition has been withheld as a trade secret.

4. First-aid measures

Inhalation	Move to fresh air. Call a physician if symptoms develop or persist.
Skin contact	Wash off with soap and water. Get medical attention if irritation develops and persists.
Eye contact	Rinse with water. Get medical attention if irritation develops and persists.
Ingestion	Rinse mouth. Get medical attention if symptoms occur.
Most important symptoms/effects, acute and delayed	Direct contact with eyes may cause temporary irritation.
Indication of immediate medical attention and special treatment needed	Treat symptomatically.
General information	Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

5. Fire-fighting measures

Suitable extinguishing media	Water fog. Foam. Dry chemical powder. Carbon dioxide (CO2).
Unsuitable extinguishing media	Do not use water jet as an extinguisher, as this will spread the fire.
Specific hazards arising from the chemical	During fire, gases hazardous to health may be formed.
Special protective equipment and precautions for firefighters	Self-contained breathing apparatus and full protective clothing must be worn in case of fire.
Fire fighting equipment/instructions	Use water spray to cool unopened containers.
Specific methods	Use standard firefighting procedures and consider the hazards of other involved materials.
General fire hazards	No unusual fire or explosion hazards noted.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures	Keep unnecessary personnel away. For personal protection, see section 8 of the SDS.
Methods and materials for containment and cleaning up	Stop the flow of material, if this is without risk. This product is miscible in water. Following product recovery, flush area with water. For waste disposal, see section 13 of the SDS. For waste disposal, see section 13 of the SDS.
Environmental precautions	Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage

Precautions for safe handling	Observe good industrial hygiene practices.
Conditions for safe storage, including any incompatibilities	Store in tightly closed container. Store away from incompatible materials (see Section 10 of the SDS). Store away from incompatible materials (see Section 10 of the SDS).

8. Exposure controls/personal protection

Occupational exposure limits	This mixture has no ingredients that have PEL, TLV, or other recommended exposure limit.
Biological limit values	No biological exposure limits noted for the ingredient(s).
Appropriate engineering controls	Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.
Individual protection measures, such as personal protective equipment	
Eye/face protection	Wear safety glasses with side shields (or goggles).
Skin protection	
Hand protection	Wear appropriate chemical resistant gloves. Suitable gloves can be recommended by the glove supplier.
Other	Wear suitable protective clothing.
Respiratory protection	In case of insufficient ventilation, wear suitable respiratory equipment.
Thermal hazards	Wear appropriate thermal protective clothing, when necessary.
General hygiene considerations	Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical and chemical properties

Appearance	
Physical state	Solid.
Form	Solid.
Color	White.
Odor	Not available.
Odor threshold	Not available.
pH	Not available.
Melting point/freezing point	Not available.
Initial boiling point and boiling range	Not available.
Flash point	Not available.
Evaporation rate	Not available.
Flammability (solid, gas)	Not available.
Upper/lower flammability or explosive limits	
Flammability limit - lower (%)	Not available.
Flammability limit - upper (%)	Not available.
Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.
Vapor pressure	Not available.
Vapor density	Not available.
Relative density	Not available.
Solubility(ies)	
Solubility (water)	Soluble.
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	Not available.
Other information	
Explosive properties	Not explosive.
Oxidizing properties	Not oxidizing.
pH in aqueous solution	7 (16.5 g/L solution)

10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	No dangerous reaction known under conditions of normal use.
Conditions to avoid	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. Contact with incompatible materials.
Incompatible materials	Strong oxidizing agents.
Hazardous decomposition products	Hydrogen chloride. Carbon oxides.

11. Toxicological information

Information on likely routes of exposure	
Inhalation	No adverse effects due to inhalation are expected.
Skin contact	No adverse effects due to skin contact are expected.
Eye contact	Direct contact with eyes may cause temporary irritation.
Ingestion	Expected to be a low ingestion hazard.

Symptoms related to the physical, chemical and toxicological characteristics	Direct contact with eyes may cause temporary irritation.

Information on toxicological effects

Acute toxicity Not known.

Components	Species	Test Results
TRISHYDROXYMETHYLAMINOMETHANE (CAS 77-86-1)		
Acute		
Oral		
LD50	Rat	5900 mg/kg
Other		
LD50	Mouse	3500 mg/kg
	Rat	2300 mg/kg

Skin corrosion/irritation	Prolonged skin contact may cause temporary irritation.
Serious eye damage/eye irritation	Direct contact with eyes may cause temporary irritation.

Respiratory or skin sensitization

Respiratory sensitization	Not a respiratory sensitizer.
Skin sensitization	This product is not expected to cause skin sensitization.
Germ cell mutagenicity	No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.
Carcinogenicity	Not classifiable as to carcinogenicity to humans.

IARC Monographs. Overall Evaluation of Carcinogenicity

Not listed.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1052)

Not regulated.

US. National Toxicology Program (NTP) Report on Carcinogens

Not listed.

Reproductive toxicity	This product is not expected to cause reproductive or developmental effects
Specific target organ toxicity - single exposure	Not classified.
Specific target organ toxicity - repeated exposure	Not classified.
Aspiration hazard	Not an aspiration hazard.

12. Ecological information

Ecotoxicity	The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.
Persistence and degradability	No data is available on the degradability of any ingredients in the mixture.
Bioaccumulative potential	No data available.
Mobility in soil	No data available.
Other adverse effects	No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.

13. Disposal considerations

Disposal instructions	Collect and reclaim or dispose in sealed containers at licensed waste disposal site.
Local disposal regulations	Dispose in accordance with all applicable regulations.
Hazardous waste code	The waste code should be assigned in discussion between the user, the producer and the waste disposal company.
Waste from residues / unused products	Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).
Contaminated packaging	Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.

14. Transport information

DOT

Not regulated as dangerous goods.

IATA

Not regulated as dangerous goods.

IMDG

Not regulated as dangerous goods.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code Not applicable.

15. Regulatory information

US federal regulations This product is not known to be a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

CERCLA Hazardous Substance List (40 CFR 302.4)

Not listed.

SARA 304 Emergency release notification

Not regulated.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1052)

Not regulated.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

SARA 302 Extremely hazardous substance

Not listed.

SARA 311/312 Hazardous chemical No

SARA 313 (TRI reporting)

Not regulated.

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Not regulated.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Safe Drinking Water Act (SDWA) Not regulated.

US state regulations

California Proposition 65

California Safe Drinking Water and Toxic Enforcement Act of 2016 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins. For more information go to www.P65Warnings.ca.gov.

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	Yes
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
Taiwan	Taiwan Chemical Substance Inventory (TCSI)	No

Country(s) or region	Inventory name	On inventory (yes/no)*
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information, including date of preparation or last revision

Issue date	September-05-2018
Version #	01
Disclaimer	GFS Chemicals, Inc. cannot anticipate all conditions under which this information and its product, or the products of other manufacturers in combination with its product, may be used. It is the user's responsibility to ensure safe conditions for handling, storage and disposal of the product, and to assume liability for loss, injury, damage or expense due to improper use. The information in the sheet was written based on the best knowledge and experience currently available