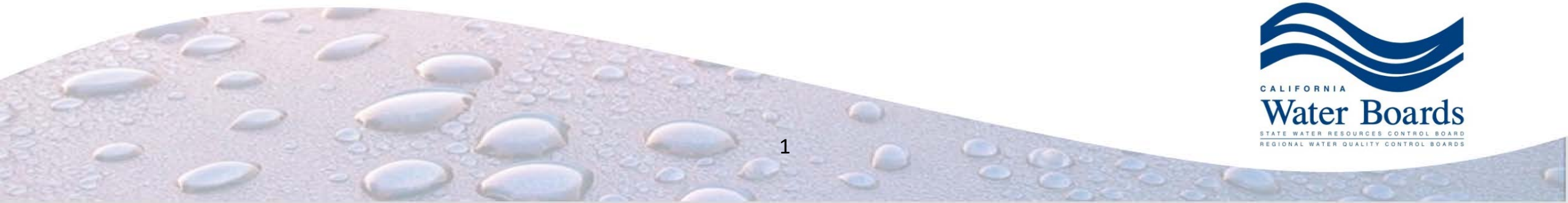


State Water Resources Control Board PFAS Phased Investigation Approach

Daniel Newton, Kurt Souza, and Betsy Lichti



CalEPA Effort

- **California Air Resources Board (CARB)**
- **Department of Pesticide Regulation (DPR)**
- **Department of Toxic Substances Control (DTSC)**
 - Groundwater Contamination Monitoring
 - Hazardous Waste Management
 - Safer Consumer Products
- **Office of Environmental Health Hazard Assessment (OEHHA)**
- **State Water resource Control Board**
 - Division of Water Quality (DWQ)
 - Division of Drinking Water (DDW)





Actions to Date

U.S. EPA	U.S. EPA	DDW	DDW	DDW	U.S. EPA
2013-2015	2016	2016	2018	2018	2019
Third Unregulated Contaminant Monitoring Rule	Health Advisory 70 ppt	Actions Based on Health Advisory	Notification Levels & Response Levels	Lab Capacity	Action Plan

Actions to Date

SWRCB (DWQ+DDW)

March 6, 2019

PFAS Phased Investigation Approach, Presented at Water Board Meeting

Panel of Federal and State Agencies, and Non-Governmental Organizations

- Inform on PFAS's, potential sources and risks to drinking water
- Present the Water Board's Investigation Plan
 - Total of 3 Phases



State Water Resources Control Board

NOTICE OF PUBLIC MEETING

PERFLUOROALKYL SUBSTANCES (PFAS) INFORMATIONAL ITEM

NOTICE IS HEREBY GIVEN that State Water Resources Control Board (State Water Board) present an informational item on March 6, 2019 consisting of an invited panel of Federal and State Agencies, and Non-Governmental Organizations. The goal of this informational item is to inform the Water Board and public of Perfluoroalkyl Substances (PFAS), potential sources, and potential risks to drinking water. Panelists will provide updates on existing state & federal actions, as well as the **Water Board's** Action Plan.

Wednesday, March 6, 2019, 9:30 a.m. – 12:30 p.m.
Joe Serna Jr. - CalEPA Headquarters Building
Coastal Hearing Room
1001 I Street, Second Floor



PFAS Phased Investigation Approach

Phase I

Source investigation & nearby drinking water well sampling at:

- **Airports:** training with Aqueous Film Forming Foam (AFFF)
- Municipal solid waste (MSW) **landfills**
- Impacted drinking water sources identified by the 2013-15 Third Unregulated Contaminant Monitoring Rule (**UCMR3**) monitoring efforts and adjacent small systems.

PFAS Phased Investigation Approach

Phase I

Source investigation & nearby drinking water well sampling at:

- **Airports:** Public water system source wells within a 2 mile radius
- Municipal solid waste (MSW) **landfills:** ...within a 1 mile radius
- Impacted drinking water sources identified by the 2013-15 Third Unregulated Contaminant Monitoring Rule (**UCMR3**) monitoring efforts and adjacent small systems. ...within a 1 mile radius

Final review by the District Engineer prior to issuing orders.



PFAS Phased Investigation Approach Phase II (Draft)

Source investigation & nearby drinking water well sampling at:

- Primary manufacturing facilities (verifying none in CA)
- Refineries, bulk terminals, & non-airport fire training areas
- 2017-2018 urban wildfire areas

(Jun 2019 – Aug 2019)

PFAS Phased Investigation Approach Phase III (Draft)

Source investigation & nearby drinking water well sampling at:

- Secondary manufacturing sites where PFAS-containing materials were discharged into wastewater
- Wastewater treatment & pre-treatment plants

(Sep 2019 – Nov 2019)

PFAS Phased Investigation Approach Time Line

Phases II and III investigation to begin summer/fall 2019.

Each source well investigation phase lasts 1 year (quarterly sampling).

PFAS Phased Investigation Approach

Phase I

Status:

- **DDW started issuing orders to water systems middle of March**
- **Nearly complete with issuing orders**

- **Phase I Statistics (Final list of wells subject to change)**

PFAS Phased Investigation Approach Phase I

Number of Source Wells by Criteria (Draft)

	PFAS Detect	Near PFAS Detect (1 mi)	Near Landfill (1mi)	Near Airport (2mi)	Near Airport (2mi) and Landfill (1mi)	Near PFAS Detect (1mi) and Airport (2mi)	PFAS Detect and Near Airport (2 mi) and Landfill (1mi)	Near PFAS Detect (1mi) and Airport (2mi) and Landfill (1mi)	Grand Total
Grand Total	99	161	138	215	32	10	3	2	660

PFAS Phased Investigation Approach

Phase I

Number of Source Wells by County (Draft)

County	Grand Total
ALAMEDA	14
BUTTE	24
CONTRA COSTA	1
DEL NORTE	3
FRESNO	37
IMPERIAL	3
INYO	1
KERN	9
KINGS	1
LASSEN	5
LOS ANGELES	141
MADERA	3
MARIPOSA	1
MERCED	5
MONO	1
MONTEREY	19
NAPA	2
ORANGE	66
PLACER	1
RIVERSIDE	93
SACRAMENTO	32
SAN BERNARDINO	45
SAN DIEGO	21
SAN JOAQUIN	14
SAN LUIS OBISPO	31
SAN MATEO	1
SANTA BARBARA	18
SANTA CLARA	25
SANTA CRUZ	6
SHASTA	11
SISKIYOU	2
SONOMA	4
STANISLAUS	3
TEHAMA	3
TULARE	1
VENTURA	13
Grand Total	660

Preliminary well numbers:

660 Wells

209 Water Systems

36 Counties

Compliance Order (H&S 116400):

- **Cover Letter**
- **Order – Requires Source monitoring**
 - **Quarterly sampling for 1 year**
 - **Source(s) specifically listed in the order**
 - **If source is out of service, please contact your local District office to develop a schedule**

- **First sample by June 30th**

- **LPA's**
 - **Notification Letter to CHO/CEHD**
 - **DDW field offices issued all Orders**



Order: Sampling Details

- **Resampling option**
 - Initial quarterly sample is detected above a notification level (NL) or a positive sample result
 - Water system has the option to collect a confirmation sample within 30 days
 - All samples collected within a quarter will be averaged to determine compliance with the NL.
 - If a positive result for a source is followed by a confirmation sample result less than the laboratory method reporting limit, a second confirmation sample may be taken. Two ND samples following a positive result, the positive result will be disregarded.



Order: Sampling Details

➤ Treated Sampling Option

- Treated water sampling cannot be substituted for source water monitoring in the order.
- If a source is treated (blending or other treatment), treated water sampling can be used in lieu of source sampling for notification purposes. (Please discuss prior to sampling with your local District office)
 - Consumer Confidence Reports
 - Notification Level compliance



Reporting Results

- **Laboratory shall submit all results via EDT not later than the 10th day of the following month**
- **Consumer Confidence Reports**
 - **All constituents required to be sampled by public water systems are to be included in the annual Consumer Confidence Report required by Health and Safety Code Section 116455.**
 - **Water delivered to the customers**



Reporting Results

➤ Notification Level

➤ PFOA = 14 ppt

➤ PFOS = 13 ppt

➤ Health and Safety Code section 116455 requires notification of a local agency (city and/or county and CPUC if applicable) of source contamination exceeding a notification level.

➤ Delivered by a public water system for human consumption

➤ The NL notification is required once. If a source remains in service, DDW recommends annual notification to the local agency

➤ Response Level

➤ Total concentration of PFOS and PFOA = 70 ppt

➤ Recommendation – Remove from service



PFAS Drinking Water Sample Collection & Analysis

**Betsy Lichti, Chief
Quality Assurance Section
Division of Drinking Water**

**Water System Training
April 3, 2019**



Analytical Methodology

- Acceptable methods that can be used by an ELAP accredited Lab:
 - EPA Method 537 Revision 1.1 (14 PFAS analytes)
 - EPA Method 537.1 (18 PFAS analytes)
- NL for PFOA & PFOS identifies the use of EPA Method 537 Rev 1.1
- Orders allow use of both methods
- ELAP now offering accreditation for EPA Method 537.1
 - All labs seeking accreditation must request EPA Method 537.1





EPA Method 537.1

Parameters	Minimum Requirements
Sample volume	250 mL
Container/cap	Polypropylene bottle/screw cap
Sample preservation	Trizma [®]
Field Reagent Blank	One per sample site
Temperature	
After sample collection	<10°C (50°F) within 48 hours but not frozen
Sample stored	<6°C (42.8°F) but not frozen
Holding Time	
Extraction	Within 14 days of collection
Analyses	Within 28 days of extraction
Minimum Reporting Limit (MRL)	Report MRL with analytical results

Purpose of Sampling Guidance

This guidance is a recommendation for sample collection to prevent cross-contamination

Why is this different from other samples?

- PFAS are detected at very low concentrations
 - ng/L or ppt
 - equivalent to one grain of salt in an Olympic size swimming pool
- High potential for contamination of a sample through inadequate planning and preparation



Where to find Sampling Guidance

- Attached to Orders
- Check for updates to guidance online at
https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/PFOA_PFOS.html
- Also posted online:
 - Laboratories accredited to analyze for PFAS in Drinking Water
 - List will be updated as more labs become accredited



Sample Types Specified

- Field Sample - required
- Field [Reagent] Blank - required
- Field Duplicate – recommended
- Trip Blank - NOT REQUIRED
 - not specified in EPA Methods 537 Rev 1.1 or 537.1



Field Sample Collection

- Collected directly from a tap on the well discharge line, **at a location prior to any treatment**
- Flush to waste at full flow for a **minimum of 15 minutes** before sampling collection
- Flush sample tap thoroughly
- Avoid taps with Teflon[®] tape



Field Blank Procedures

- A sample bottle filled at the sample site using reagent water* provided by the laboratory
- Determines if the sampler or surroundings have jeopardized the integrity of the sample
- Must be collected at each sample site and stored in the ice chest used to store and transport samples
- Laboratory provides field blank sample bottle, reagent water and the preservative (if not already added to the sample bottle)

***Reagent Water:** *Water purified for laboratory purposes*



Field Blank Procedures

Sample Collection:

- At the sample site, open the Field Blank sample bottle, pour the reagent water into the sample bottle, seal and label this bottle as the Field Blank
- Record the field blank identification number on the COC form
- This sample is shipped back to the laboratory along with the field samples

Lab Guidance:

- Analysis of the Field Blank is required only if a Field Sample contains an analyte at or above the MRL*
- If an analyte found in the Field Sample is also present in the Field Blank at a concentration greater than 1/3 the MRL, then all samples collected with that Field Blank are invalid and must be recollected and reanalyzed

**DDW recommends analysis of the Field Blank at the same time as the Field Sample to reduce the chance of variability and to ensure it is analyzed within the holding time specified in the method*

Field Duplicate Sample*

- Provides information about the precision associated with sample collection, preservation, storage and laboratory procedures
- Two separate samples collected at the same time and place under identical circumstances, and treated exactly the same throughout field and laboratory procedures

***Field Duplicate Sample:** *collection of this sample is based on your lab's recommendation, and should be collected using procedures provided by the lab.*

Avoid Sample Contamination

- All samplers should refrain from the use of the following products at **least 24 hours prior** to the sampling event
 - Cosmetics, moisturizers, sun blocks, fragrances, creams or other personal care products
 - Pre-package food, fast food wrappers or aluminum foil
 - New or unwashed clothing
 - Clothing washed with fabric softeners or dried with anti-static sheets

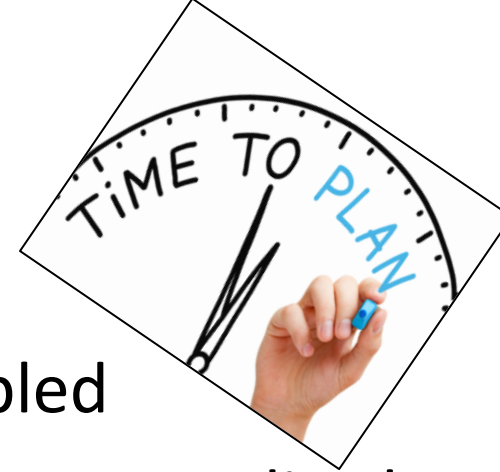


Other items to avoid

- Teflon® and other fluoropolymer containing materials
- Waterproof/treated paper on field notebooks
- Waterproof or permanent markers (such as Sharpie®)
- Adhesive paper products (as Post-it® Notes or scotch tape)
- Water-resistant/waterproof clothing (such as Gore-Tex®)
- Glass bottles
- Avoid sampling during rain if possible
- Do not eat, drink or smoke during sampling activity



Before Sampling



- Be familiar with each site being sampled
- Coordinate the sampling event with an accredited laboratory
 - Bottles, sample preservation, chain of custody forms, ice chest, quality control samples, shipping instructions and sample arrival at lab
- Bottles labeled before sample collection
 - Verify the site ID and set of bottles to sample
- Ensure that the ice chest interior is clean
- Ensure an adequate number of sealable bags are available to store all sample bottles

Sample Collection Procedures

- Wash hands before sampling with Alconox[®] or Liqui-Nox[®] soap and rinse with deionized water
- Wear nitrile gloves
- Check that the label ID on the sample container matches the chain of custody (COC)
- Sample bottles and COC could be filled out in advance



Remove nitrile gloves after sampling at each site and dispose of them in a sealed plastic bag

Sample Shipping

- Pack the bottles (which are placed inside sealable plastic bags provided by the laboratory) upright in the ice chest. Ensure that the bottles cannot move sideways at all. Any extra space should be packed with ice
- Put additional ice inside of double plastic bags and place these on top of the bottles
- Temperature during shipping/storage:
 - Samples must arrive at the laboratory within 48 hours of sampling, at $\leq 10^{\circ}\text{C}$ (50°F) but not frozen
 - If samples are received more than 48 hours after sampling, they must be $\leq 6^{\circ}\text{C}$ (42.8°F) but not frozen
 - Samples stored in the lab must be $\leq 6^{\circ}\text{C}$ (42.8°F) until extraction
- Extraction should be as soon as possible but within 14 days



Remember!

- Your data is only as good as your sampling techniques
- Ensure your lab is accredited for PFAS methods*
- Get updated PFAS sampling guidance*
- Results should be reported electronically to DDW
- **Hard copy results may be requested by DDW to verify the QC related information**

*Find at: https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/PFOA_PFOS.html



Contact us for questions:

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Questions?

Public Access to Information and Resources

- Website (guidance, accredited labs, updates, and FAQs) : <http://waterboards.ca.gov/pfas>
- Email: PFAS@waterboards.ca.gov
- GAMA: PFAS Fact Sheets and upcoming data viewing tools waterboards.ca.gov/gama/
- GeoTracker: Sampling/Investigation Results <https://geotracker.waterboards.ca.gov/>

