



Central Valley Regional Water Quality Control Board

14 June 2024

Michael Wegley

Engineering Department
City of Merced
678 W 18th Street
Merced, CA 95340

REQUEST FOR MONITORING WELL INSTALLATION AND PER- AND POLY-FLUOROALKYL SUBSTANCES (PFAS) GROUNDWATER SAMPLING WORK PLAN, MERCED MUNICIPAL AIRPORT (GEOTRACKER ID: SL185232902), S. WEST AVE. & RIGGS AVE. MERCED, MERCED COUNTY, CA

Central Valley Regional Water Quality Control Board (Central Valley Water Board) staff reviewed the PFAS results dated 9 June 2023 and the Adsorbable Organic Fluorine (AOF) results dated 6 September 2023 for the groundwater samples collected from the Merced Municipal Airport (Airport) in March 2023. The City of Merced (City) submitted the electronic data of the above PFAS and AOF results to GeoTracker in response to the Central Valley Water Board's 21 June 2021 letter requesting PFAS groundwater sampling at the Airport. Compared with the initial sampling results in 2016, PFAS concentrations in multiple monitoring wells at the Airport considerably increased in 2023. In the March 2023 sampling event, elevated PFAS concentrations significantly exceeding the USEPA's recently adopted [Maximum Contaminant Levels \(MCLs\)](#) for drinking water were observed in multiple monitoring wells across the Airport site. The maximum concentrations of perfluorooctanesulfonic acid (PFOS), perfluorooctanoic acid (PFOA), and perfluorohexanoic acid (PFHxS) were observed in one of the two on-site downgradient monitoring well pairs (MW-23/BZW-5, Table 1).

By **26 July 2024**, please submit a work plan that proposes installing and sampling new monitoring wells for PFAS analysis (Work Plan) to fully delineate the PFAS groundwater plume in both lateral and vertical directions at the Airport. At a minimum, please include the following information in the Work Plan:

1. Please describe the subsurface hydrogeologic conditions at the Airport and clarify whether the three groundwater zones in the vertical direction underlying the Airport property [i.e., the shallow (A), intermediate (B), and deep (C) zones] are hydrologically continuous. In particular, please clarify the local hydrologic connectivity between the shallow zone and the intermediate zone near monitoring well pair MW-23/BZW-5 and well pair MW-24/BZW-6.
2. Please describe the use and storage history of aqueous film-forming foam (AFFF) at the Airport, including but not limited to the following information:

MARK BRADFORD, CHAIR | PATRICK PULUPA, ESQ., EXECUTIVE OFFICER

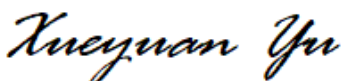
- a. A list of AFFF products purchased by the Airport, including product volume and purchase date. The Material Safety Data Sheet (MSDS) for each AFFF product may be requested at a later date.
 - b. A list of known or potential AFFF release areas, including AFFF storage areas, fire training areas, hangars, and historical emergency response (e.g., plane crash or other fire accident) areas; for each identified area, please describe the area size, in-door or on open field, ground surface conditions (e.g., paved or bare soil), and the stormwater flow directions and, if available, stormwater collection system at each area.
 - c. An introduction of fire training history at the Airport, including training location, training practice frequency, and the estimated AFFF use volume in each practice.
 - d. A map illustrating the areas identified in 2.b. above.
3. In addition to the known historical fire training area that is located at the southeastern corner of the Airport property (i.e., the known source zone), please identify and present on a map the other areas where other PFAS-containing materials (e.g., hydraulic oil) are stored, used, and/or disposed of.
 4. Please include a plan to install new monitoring wells to fully characterize the lateral and vertical extents of the PFAS groundwater plume:
 - a. For the two existing well pairs (MW-23/BZW-5 and MW-24/BZW-6) that are downgradient from the known source zone, at least the upper two groundwater zones (Zones A and B) in the directions downgradient and cross-gradient from the well pairs need to be investigated to delineate the PFAS plume boundary.

Immediately near each well pair discussed above, one additional monitoring well that samples the deep groundwater zone (Zone C) should be installed to assess the PFAS plume's vertical extent at each well pair location.

- b. In the direction that is upgradient from the known historical training area, at least one monitoring well pair that monitors Zone A and Zone B groundwater should be installed to delineate the PFAS groundwater plume upgradient of the known source zone. The Airport may re-install MW-15 to a deeper depth in place of the requested Zone A well.
- c. Include a map showing the number and locations of the proposed new wells, labeling each well based on the groundwater zone it samples.
- d. Summarize the screen interval length and depth information for each proposed new well in a table.

5. Please include a plan to collect groundwater samples from all new wells for PFAS analysis. At a minimum, please also include downgradient well pairs MW-23/BZW-5 and MW-24/BZW-6, and wells MW-18, MW-22, BZW-2, BZW-4, CZW-2, and CZW-3 of the existing monitoring well network at the Airport in the sampling event for PFAS analysis. This sampling event may be combined with the routine groundwater monitoring required by the Central Valley Water Board Monitoring and Reporting Program (MRP) Order R5-2022-0808.
6. Please follow the State Water Board's [Per- and Polyfluoroalkyl Substances \(PFAS\) Sampling Guidelines for Non-Drinking Water](#) for the collection of groundwater samples.
7. Please include the 40 compounds in [Table 5 of the USEPA Method 1633](#) for PFAS analysis of groundwater samples. The PFAS analysis should be performed by an analytical laboratory accredited by the California Environmental Laboratory Accreditation Program for USEPA Method 1633. The PFAS analysis should incorporate the quality control measures and acceptance criteria from the USEPA Method 1633.
8. Please include an implementation schedule for completing the new well installation, PFAS groundwater sampling and analysis, and the subsequent preparation and submission of investigation results. Please note the investigation results should be submitted in a final report within 90 days of the field collection of groundwater samples requested in comment 5 above.

By **26 July 2024**, please submit the Work Plan that addresses comments 1 through 7 above. If you have any questions or concerns, please call me at 916-464-4729 or email me at helen.yu@waterboards.ca.gov.



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UST & AST Program



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**Table 1 – Select PFAS Analysis Data from On-site Downgradient Wells^a
March 2023**

Sample Type	Sample Location	PFOA (ng/L)	PFOS (ng/L)	PFBA (ng/L)	PFHxA (ng/L)	PFHxS (ng/L)	PFNA (ng/L)	PFBS (ng/L)	HI (unitless)
Groundwater	MW-23	79	780	340	780	680	8.9	180	70
	BZW-5	49	180	290	670	310	3.3	130	30
	MW-24	30	92	80	170	190	ND	43	20
	BZW-6	24	85	63	140	170	ND	41	20
MCL		4	4	-	-	10	10	-	1
RSL		0.0027	0.2	1,800	990	39	5.9	600	-

- ng/L – Nanograms per liter
- PFOA – Perfluorooctanoic acid
- PFOS – Perfluorooctanesulfonic acid
- PFBA – Perfluorobutanoic acid
- PFHxA – Perfluorohexanoic acid
- PFHxS – Perhexanesulfonic acid
- PFNA – Perfluorononanoic acid
- PFBS – Perfluorobutanesulfonic acid
- HFPO-DA – Hexafluoropropylene oxide dimer acid
- ND – Below Detection Limit
- MCL – [US EPA Maximum Contaminant Levels for drinking water](#)
- HI – Hazard Index; HI is for two or more of four PFAS (PFBS, PFHxS, PFNA, and HFPO-DA) as a mixture and calculated as follows:

$$\text{Hazard Index (1 unitless)} = \left(\frac{[\text{HFPO-DA}_{\text{ppt}}]}{[10 \text{ ppt}]} \right) + \left(\frac{[\text{PFBS}_{\text{ppt}}]}{[2000 \text{ ppt}]} \right) + \left(\frac{[\text{PFNA}_{\text{ppt}}]}{[10 \text{ ppt}]} \right) + \left(\frac{[\text{PFHxS}_{\text{ppt}}]}{[10 \text{ ppt}]} \right)$$

RSL – [US EPA Target Hazard Quotient 0.1 Regional Screening Levels for residential tap water](#)

* J denotes a result less than the reporting limit but above the minimum detection limit

^a MCL exceedances are bolded; RSL exceedances are shaded