



UPDATE ON PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS) REGULATIONS AND WATER TREATMENT APPROACHES

Public Utilities

Mobility & Infrastructure Committee

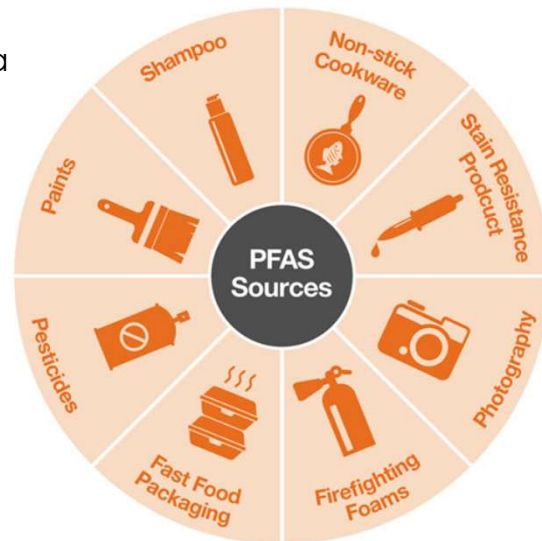
June 12, 2025

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BACKGROUND

Per- and Polyfluoroalkyl Substances (PFAS) are human-made chemical compounds, a group of more than 12,000 substances of emerging contaminants of concern.

1. Designed to repel oil and water
2. Known as “forever chemicals”
3. Bioaccumulate in living organisms
4. Potential to cause adverse human and ecological health effects



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ABBREVIATIONS & ACRONYMS

- \$/kgal Dollar per 1,000 gallons
- ACWA Association of California Water Agencies
- AWWA American Water Works Association
- CA California
- DBCP Dibromochloropropane
- DDW Division of Drinking Water a division of the SWRCB
- EPA Environmental Protection Agency - Federal regulatory agency
- GAC Granular activated carbon
- Gen X Trade name for a processing aid technology used to make high-performance fluoropolymers
- GPM Gallons per minute
- HFPO-DA Hexafluoropropylene oxide dimer acid
- HI Hazard index
- IX Ion exchange
- JWN John W. North
- MCL Maximum contaminant level
- NL Notification level
- NPDWR National primary drinking water regulation



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ABBREVIATIONS & ACRONYMS

- NPV Net present value (estimated in 2022)
- O&M Operation & Maintenance
- PFAS Per and polyfluoroalkyl substances
- PFBS Perfluorobutane sulfonic acid
- PFHxS Perfluorohexane sulfonic acid
- PFNA Perfluorononanoic acid
- PFOA Perfluorooctanoic acid
- PFOS Perfluorooctane sulfonic acid
- PPT Parts per trillion
- PV Present value (estimated in 2022)
- RFP Request for proposals
- RL Response level
- RPU Riverside Public Utilities
- SWRCB State Water Resources Control Board - State regulatory agency
- TCE Trichloroethene
- TM Transmission main
- WTP Water treatment plant



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LEGISLATIVE HISTORY

1. In May 2016, US EPA issued a lifetime health advisory for (PFOS) and (PFOA) for drinking water, to notify customers of the presence of levels over 70 parts-per-trillion (ppt).
2. In July 2018, State Water Resources Control Board, Division of Drinking Water (DDW) established an interim notification level (NL) of 14 ppt for PFOA and 13 ppt for PFOS and a single response level (RL) of 70 ppt for the combined concentrations of PFOA and PFOS.
3. In August 2019, DDW revised the NL to 6.5 ppt for PFOS and 5.1 ppt for PFOA. RL remains at 70 ppt.
4. On February 6, 2020, DDW issued updated drinking water RL of 10 ppt for PFOA and 40 ppt for PFOS based on a running four-quarter average.



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LEGISLATIVE HISTORY CONT.

5. On March 5, 2021, DDW issued a drinking water NL of 500 ppt and RL of 5,000 ppt for PFBS.
6. On October 31, 2022, DDW issued a drinking water NL of 3 ppt and RL of 20 ppt for PFHxS.
7. On March 14, 2023, US EPA proposed MCL's for six (6) compounds: PFOA: 4 ppt, PFOS: 4 ppt, PFHxS 10 ppt, Gen X 10 ppt, PFNA 10 ppt and a Hazard Index (HI) not to exceed 1 for: PFNA, PFHxS, PFBS, and GenX (HI is made up of a sum of fractions).



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ACTIONS

1. On October 28, 2019, the Board of Public Utilities approved a PFAS study.
2. On May 23, 2022, the Board of Public Utilities received and filed an update on the Per and Polyfluoroalkyl Substances Updates.
3. In November 2022, staff received the final report from the consultant, HDR, outlining a cost-effective and optimized long-term treatment strategy for reducing PFOA and PFAS.
4. On November 14, 2022, staff presented the results of the PFAS removal demonstration study at the Palmyrita Treatment Plant to the Board of Public Utilities.

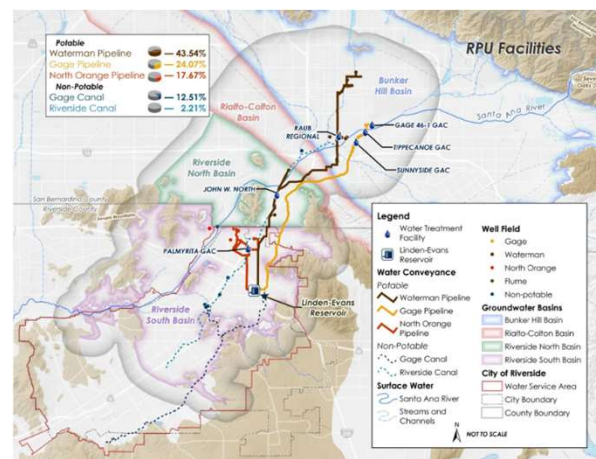


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DISCUSSION

1. Forty-Five groundwater wells extract water from the Riverside, Rialto Colton and Bunker Hill groundwater basins.
2. Several wells are treated with GAC and/or IX to remove anthropogenic compounds.
3. Three transmission mains convey the City's domestic groundwater to a 32 million-gallon central reservoir complex, where it receives final treatment via blending and disinfection before being delivered to customers.



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DISCUSSION

1. Water samples from more than 30 wells exceed the existing State notification levels for PFAS.
2. Treatment capacity is still capable of combining water sources to reduce PFAS concentrations during low demand season, but in high water demand periods, it will exceed the PFAS Federal limits without additional treatment or turning off wells with high PFAS concentrations.
3. Three (3) alternatives with two (2) commercially and readily available PFAS treatment technologies, GAC and IX, were identified to reduce the concentrations as part of the HDR Study.



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GAC 20-Year Life Cycle Cost Estimate is Higher than that of IX

Parameter	Granular Activated Carbon			Ion Exchange		
	Alt 1 – Regional	Alt 2 – North Orange & Palm Meadows	Alt 3 – North Orange & JWN	Alt 1 – Regional	Alt 2 – North Orange & Palm Meadows	Alt 3 – North Orange & JWN
Design Capacity (gpm)	23,458	10,850	12,454	23,458	10,850	12,454
Capital Cost	\$84 M	\$35 M	\$38 M	\$63 M	\$24 M	\$27 M
NPV Total O&M	\$238 M	\$107 M	\$117 M	\$248 M	\$108 M	\$124 M
Total PV	\$322 M	\$142 M	\$156 M	\$311 M	\$132 M	\$151 M
Annual \$/kgal Treated	\$1.30	\$1.24	\$1.19	\$1.26	\$1.16	\$1.15



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DISCUSSION

The data below compares PFAS concentrations at RPU's drinking water compliance point to the Federal and State standards.

Units in parts per trillion (ppt)	PFOA	PFOS	GenX	PFBS	PFNA	PFHxS	HI (<100%)
CA Notification Level	5.1	6.5		500		3	
Compliance Point (7th & Chicago) *	ND - 4.7	ND - 6.4	ND	ND - 4	ND	ND -5.5	
Health-Based Value and EPA MCL	4	4	10	2000	10	10	
Hazard Index (HI) in %			0%	0-0.002%	0%	0-61%	0-61%

*Data ranges 2019-current. SWRCB-DDW proposed MCLs are anticipated this year.



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DISCUSSION

1. The analysis revealed that an additional local treatment plant on the Waterman transmission main would be needed in addition to the optimum alternative proposed by the consultant HDR.
2. Staff also modified the Alternate 2 proposal to expand the current Palmyrita WTP, which will provide treatment on the North Orange transmission main.

The table below shows the amount of reduction needed to meet the regulations.

Units in parts per trillion (ppt)	PFOS	PFOA	PFHxS
CA Notification Level (NL)	5.1	6.5	3
Percent Reduction to NL	38%	24%	70%
EPA MCL	4	4	10*
Percent Reduction to MCL	62%	31%	23%

*PFHxS MCL is part of the Hazard Index (HI)



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DISCUSSION

1. On January 24, 2022, the Board of Public Utilities approved the Drinking Water Quality Policy Principles.
2. On February 22, 2022, the City Council adopted the Drinking Water Quality Policy Principles.
3. The nine water quality policy principles guide RPU in its compliance with drinking water standards, as well as its coordination with Federal and State policies and agreements with responsible parties.
4. RPU is actively pursuing responsible parties through litigation, collaborating with regulatory agencies, and has been evaluating and developing treatment options to reduce PFAS levels and meet regulatory requirements.



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DISCUSSION

1. RPU's low water rates are a result of the City's success in mitigating higher treatment costs by successfully holding polluters responsible for groundwater contamination. Over the last 30 years, this effort has provided funding for five of the six water treatment plants to reduce contamination.
2. RPU is actively participating in litigation to reduce the impacts of PFAS treatment costs.
3. Compliance with the Federal PFAS MCLs is estimated to cost Riverside the following:
 - Capital costs of three treatment plants \$110,000,000.
 - Annual operating and maintenance costs of \$15,600,000.
 - Financing costs of \$105,000,000 over 30 years without settlement revenue.



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DISCUSSION

1. The estimated annual rate impacts for the City's drinking water customers in the first five years beginning July 1, 2026, are as follows:

Estimated Annual Rate Increase Effective Date	7/1/2026	7/1/2027	7/1/2028	7/1/2029	7/1/2030
PFAS Treatment – without settlement proceeds (100% bond funded)	4.5%	4.5%	4.5%	4.5%	4.5%

2. A cost of service and rate design study will be needed to address funding requirements.
3. Augmentation of the current five-year rate plan will be necessary.
4. Public outreach will be incorporated with these efforts.



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STRATEGIC PLAN ALIGNMENT



Priority No. 4 Environmental Stewardship

Goal No. 4.2 – Sustainably manage local water resources to maximize reliability and advance water reuse to ensure safe, reliable, and affordable water to our community.

Cross-Cutting Threads



Community Trust



Equity



Fiscal Responsibility



Innovation



Sustainability & Resiliency



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RECOMMENDATION

That the Mobility and Infrastructure Committee:

1. Receive a report on Per- and Polyfluoroalkyl Substances (PFAS) regulations and water treatment approaches; and
2. Recommend a report on Per- and Polyfluoroalkyl Substances (PFAS) regulations and water treatment approaches be presented to the Board of Public Utilities and to the City Council; and
3. Direct staff to bring a proposal to the Board of Public Utilities to conduct a cost of service and rate design study to address the funding requirements to comply with the Per- and Polyfluoroalkyl Substances (PFAS) regulations.



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