Update on Emerging Water Quality Issues: Per- and Polyfluoroalkyl Substances (PFAS)

Engineering and Operations Committee
Item 6c
July 8, 2019

Per- and Polyfluoroalkyl Substances (PFAS)

- Broad class of manufactured chemicals widely used to make products that resist heat, oils, grease, stains, and water
  - Teflon™ coated cookware, carpets, clothing, paper packaging for food, and fire retardants
- First developed in 1940s
  - Over 4,500 PFAS

- Extremely stable in environment and can be found in soil, air, surface water, groundwater, wastewater plant effluent, sewage sludge and landfill

History and Use of PFAS

"Better Things For Better Living…Through Chemistry"
[DuPont advertising slogan (1935)]

https://commons.wikimedia.org/wiki/File:Happy_Pan_Poster.jpg

PFAS[1]	Development Time Period							
	1930s	1940s	1950s	1960s	1970s	1980s	1990s	2000s
PTFE	Invented	Non-Stick Coatings			Waterproof Fabrics			
PFOS		Initial Production	Stain & Water Resistant Products	Firefighting foam				U.S. Reduction of PFOS, PFOA, PFNA (and other select PFAS[2])
PFOA		Initial Production		Protective Coatings				

Adapted from Interstate Technology Regulatory Council

Per- and Polyfluoroalkyl Substances (PFAS)

- Can bioaccumulate in humans and wildlife
- Perfluorooctanoic acid (PFOA) and Perfluorooctanesulfonic acid (PFOS) are the most common PFAS in U.S.
  - Found in the blood of 95% of people tested, but declining since voluntary phase-out began in 2000
- Exposure continues due to presence in products from some companies not participating in the voluntary phase-out and from products imported from other countries

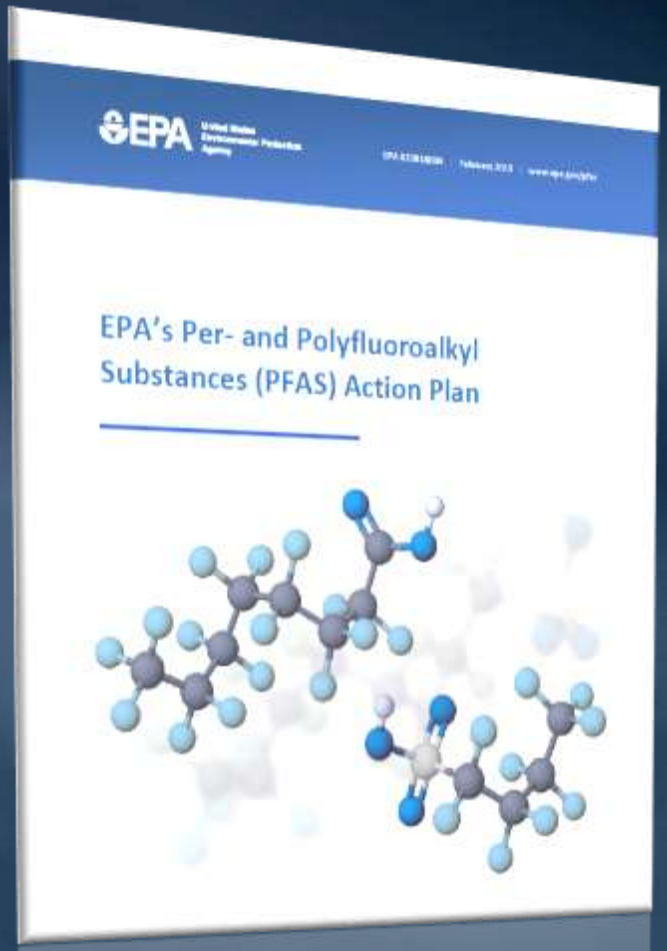
PFOA and PFOS Health Effects

- Science Advisory Board to USEPA and World Health Organization considers PFOA a "likely human carcinogen"
- Long-term exposure has been linked to the following:
  - PFOA: High cholesterol levels, ulcerative colitis, thyroid disease, testicular and kidney cancers, pregnancy induced hypertension
  - PFOS: Decreased vaccination response, liver damage, and decreased birth weight

Federal Guidelines for PFOA and PFOS

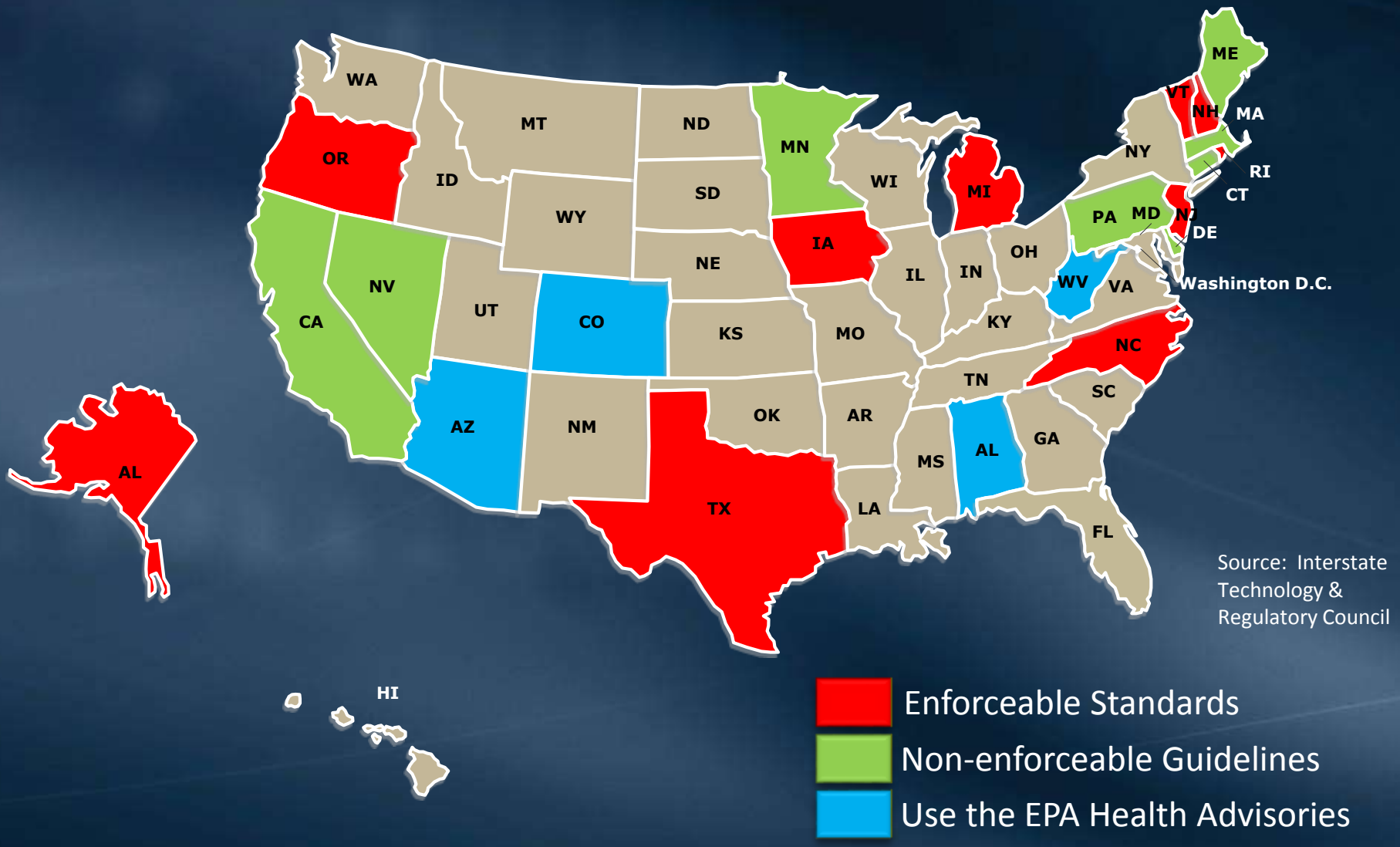
- May 2016 - USEPA established a drinking water Health Advisory (HA) at 70 ng/L [or parts per trillion (ppt)] for treated drinking water
  - HA based on combined concentration of PFOA and PFOS
  - Includes most sensitive populations with a margin of protection from lifetime exposure
  - Not a drinking water standard
  - USEPA recommends drinking water agencies take steps to assess contamination, inform consumers, and limit exposure if HA exceeded

USEPA February 2019 PFAS Action Plan



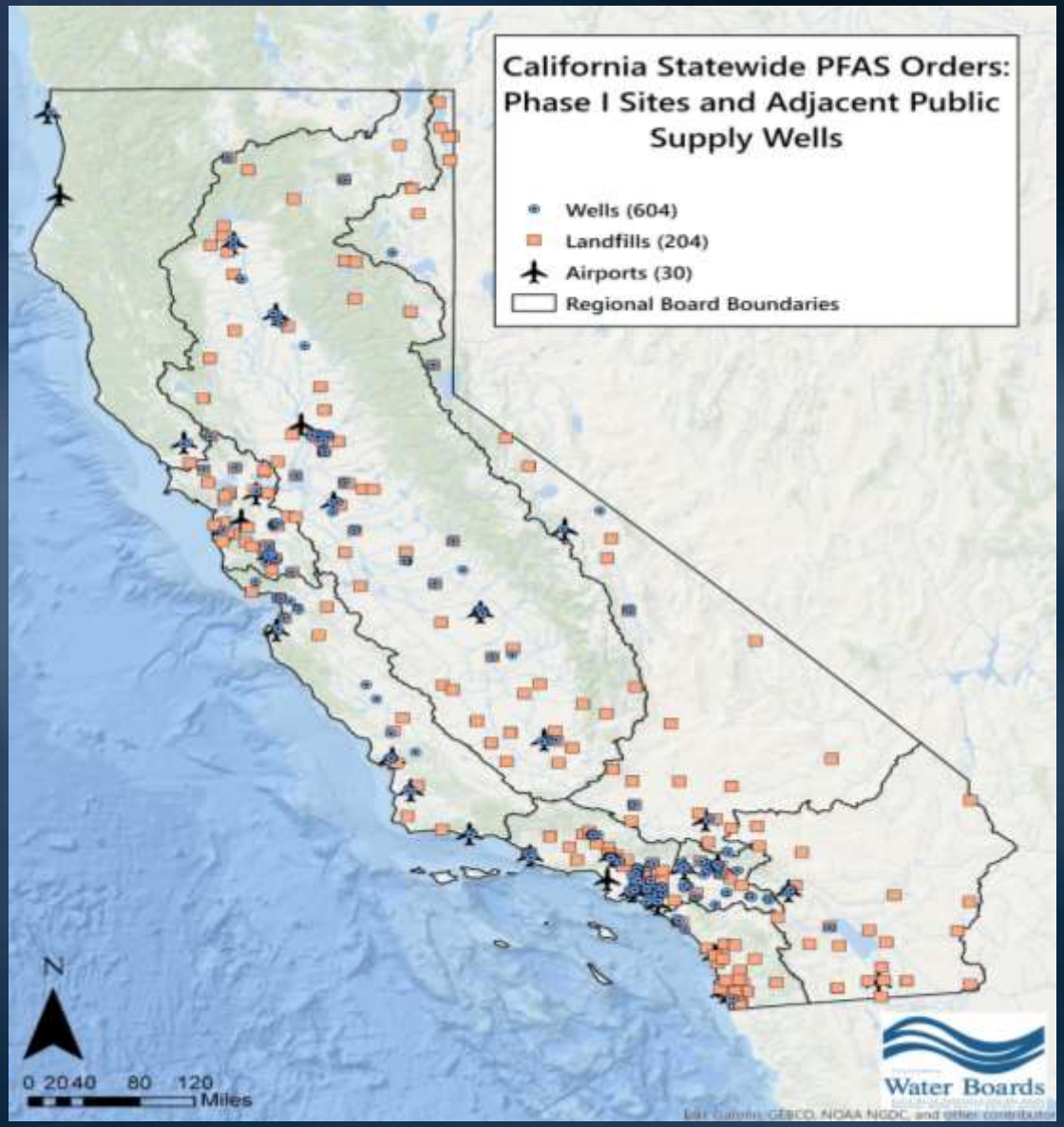
- Cleanup
- Toxics
- Monitoring
- Research
- Enforcement
- Risk Communications
- Drinking Water
  - EPA is moving forward with developing drinking water regulations for PFOA and PFOS

States with Standards and Drinking Water Guidelines for PFAS in the United States



Source: Interstate Technology & Regulatory Council

Occurrence of PFAS in California



PFAS Phase I Investigation Wells By County

Ventura - 12
Los Angeles - 139
Orange - 65
Riverside - 91
San Bernardino - 45
San Diego - 3

Slide courtesy of State Water Resources Control Board

California Guidelines for PFOA and PFOS

- July 2018 - SWRCB established Notification Levels for PFOA at 14 ppt and PFOS at 13 ppt
- Notification Level
  - Health-based advisory levels for chemicals in water that lack drinking water standards
  - If Notification Level is exceeded:
    - Wholesale water systems must notify governing bodies and water systems directly supplied with that drinking water
    - Retail water systems must notify governing body
    - SWRCB recommends that customers and consumers be notified

California Guidelines for PFOA and PFOS (cont'd)

- July 2018 - SWRCB established a Response Level of 70 ppt for the total combined PFOA and PFOS concentrations – consistent with USEPA's Health Advisory
- Response Level
  - Level at which SWRCB recommends removal of a drinking water source from service

California Guidelines for PFOA and PFOS (cont'd)

- Response Level (cont'd)
  - If an agency elects not to remove the source, the SWRCB recommends:
    - Notify local governing body
    - Notify customers that the contaminant exceeds level at which State recommends removal and reason for continued use
    - Issue a press release
    - Conduct regular sampling until contaminant drops below Response Level

California Guidelines for PFOA and PFOS (cont'd)

- Updates to California's PFOA and PFOS Notification Levels (NL) and Response Levels (RL) are expected soon.
- Reductions in PFOA and PFOS NLs and RLs could adversely impact some of our member agencies.

Other California Activities Related to PFAS

- PFAS Phased Investigation Approach
  - Phase 1: Monitoring of source water wells near airports and landfills, and known impacted drinking water sources
  - Phase 2: Monitoring of discharges from primary manufacturing facilities, refineries, bulk terminals, and non-airport firefighting facilities
  - Phase 3: Secondary manufacturing sites, wastewater treatment plants
- Sampling conducted quarterly for 1 year starting in 2019

Occurrence of PFAS in Metropolitan's Service Area

- Metropolitan
  - PFAS samples were collected in Metropolitan's source and treated waters in 2013, 2016, and 2017
  - PFOA and PFOS were not detected in any of the samples
- Member Agencies
  - PFOA and PFOS detections have been reported by some of Metropolitan's member agencies

PFAS Monitoring and Analytical Issues

- Drinking water analytical methods remain in developmental phase
  - 2009 method detects 14 PFAS
  - 2018 method detects 18 PFAS and has lower detection limits
- Some laboratories developed modified versions of USEPA Method
- Special collection procedures required due to ubiquitous occurrence of PFAS
- Metropolitan currently does not perform PFAS analysis at the Water Quality Laboratory

Treatment Technologies for PFAS

Treatment	Percent Removal[1]	Approximate Cost $/AF[2]
Activated Carbon (PAC or GAC)	up to >98%	$350
Ion Exchange	up to >99%	$350
Membrane Separation (e.g., Reverse Osmosis)	up to >99%	$500

[1] Information from USEPA's Drinking Water Treatability Database

[2] Limited data; site preparation, media regeneration and waste disposal costs greatly affect final cost of treatment

Federal PFAS Legislation

- Over 30 PFAS related bills have been introduced for 2019-2020
  - Focus on wide range of issues including detection of PFAS, restrictions on use of PFAS, establishing drinking water standards, testing and waste incineration
- S. 1790 – National Defense Authorization Act for FY 2020
  - Establish drinking water standard for PFOS and PFOA within two years
  - Add 18 PFAS to next round of unregulated contaminant monitoring
  - Designate PFAS substances as hazardous under CERCLA

State PFAS Legislation

- AB 841 (Ting, D – San Francisco)
  - Requires the Office of Environmental Health Hazard Assessment (OEHHA) to adopt a work plan and identify potential risks to human health
- AB 756 (C. Garcia, D – Bell Gardens)
  - Requires water systems to monitor for PFAS
  - Creates a new notification procedure for PFAS, if response or notification levels are exceeded

Summary and Next Steps

- PFOS and PFOA have not been detected in Metropolitan's source or treated waters
  - Metropolitan will continue to monitor for PFAS
- Metropolitan will continue supporting member agencies as they assess extent of PFAS occurrence in service areas
  - PFAS will be discussed at July 25 Member Agency Water Quality Managers Meeting
- Metropolitan will continue to track regulatory and legislative activities related to PFAS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