Civil & Environmental Consultants, Inc.

PFAS REGULATORY DEVELOPMENTS AND BUSINESS MANAGEMENT CONSIDERATIONS

MD-DC Utilities Association

Annual Environmental Conference

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Introduction

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- P.E. in Pennsylvania & Maryland; Certified Project Management Professional (PMP)

Civil & Environmental Consultants, Inc.

- Civil & Environmental Consultants, Inc. (CEC) is an employee-owned engineering and environmental consulting firm with more than 1,200 team members and 29 offices nationwide.

CEC Emerging Contaminants Group

- Multi-disciplined group of professionals collaborating to advance the technical and regulatory knowledge base.

Introduction

Agenda

- What are PFAS?
- Where are PFAS Found?
- Overview of Risks and Challenges
- Evolving State Regulations
- Developing Federal Regulations
- PFAS Risk Management Strategies
  - Example Case: PFAS in Fire Fighting Foams
  - On-Site Storage
  - Disposal Strategies
  - Release Investigation
  - Due Diligence
- Take Home Message

What are PFAS?

PFAS (from EPA Website)

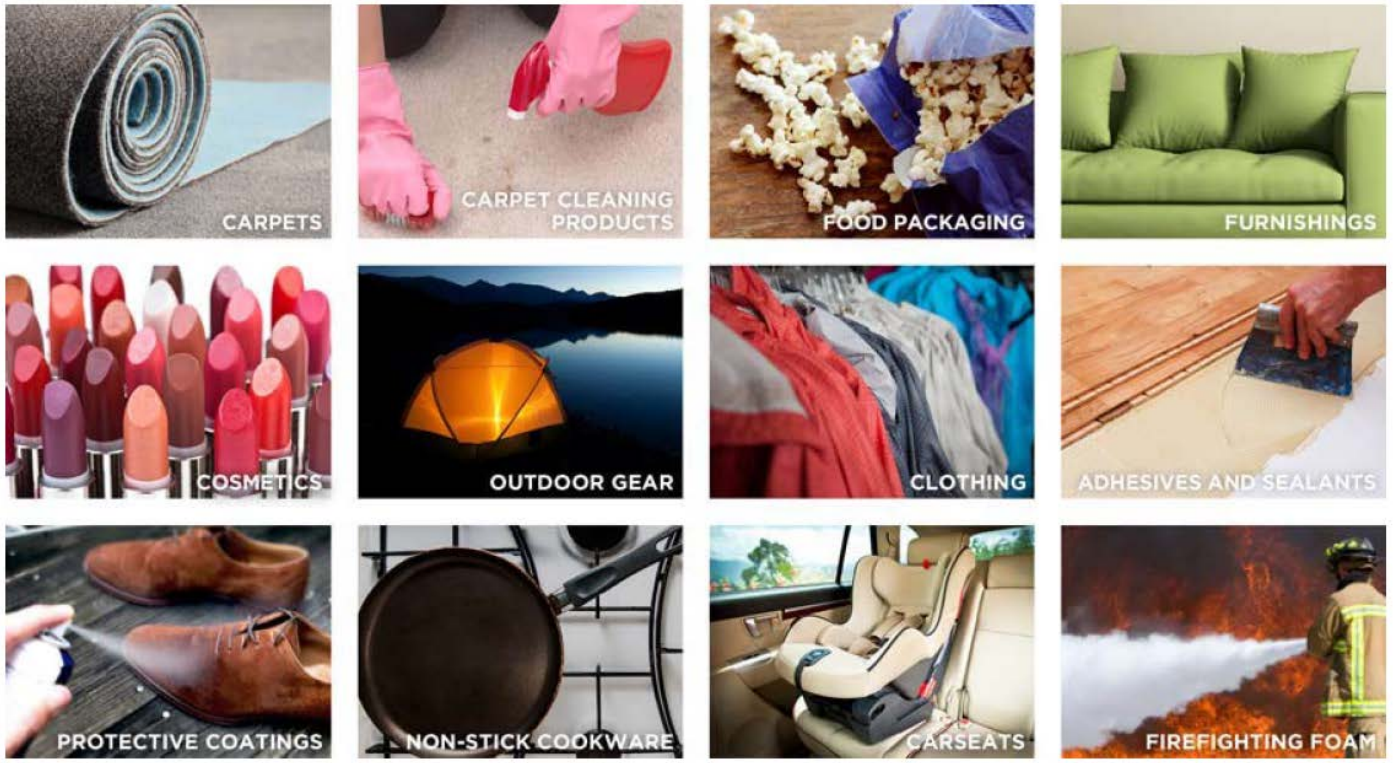
- Per- and Polyfluoroalkyl substances (PFAS) are a group of man-made chemicals that includes PFOA, PFOS, GenX, and many other chemicals.
- PFAS have been manufactured and used in a variety of industries around the globe, including in the United States since the 1940s.

What are PFAS?

PFAS (from EPA Website)

- PFOA and PFOS have been the most extensively produced and studied of these chemicals.
- Both chemicals are very persistent in the environment and in the human body – meaning they don't break down and they can accumulate in people, animals and the environment over time.
- There is evidence that exposure to PFAS can lead to adverse human health effects.

Where are PFAS found?



Credit: www.sixclasses.org

- Oil and water repellent, temperature resistant, and friction reducer.
- Anti-Fogging Spray

Industries with PFAS Use

- Aviation & Aerospace
- Automotive
- Biocides
  - Herbicides & Pesticides
- Building & Construction
- Cable & Wiring
- Cosmetics/ Personal Care Products
- Electronics
- Energy
- Firefighting Foams / Safety
- Food Processing
- Medical Products
- Metal Plating and Finishing
- Mining
- Oil Production
- Paper Products and Packaging
- PFAS Production
- Photolithography & Semiconductor
- Textiles
  - Upholstery, Carpets, Leather & Apparel
- Waste Management
  - Solid Waste (Landfills, Transfer Stations, etc.)
  - Wastewater Treatment & Biosolids

The Trouble with PFAS

- Regulation is often being led by states and is variable
- Regulation has been outpacing the science
- Strict regulation borne out of abundance of caution
  - Public Concerns (hits all the scare factors)
  - Common in Lives
  - Limited Risk Data
- The cautious regulation in some states has led to dramatically different perspectives on the magnitude of risk
- While understanding of health risks continue to evolve, business risks have become real

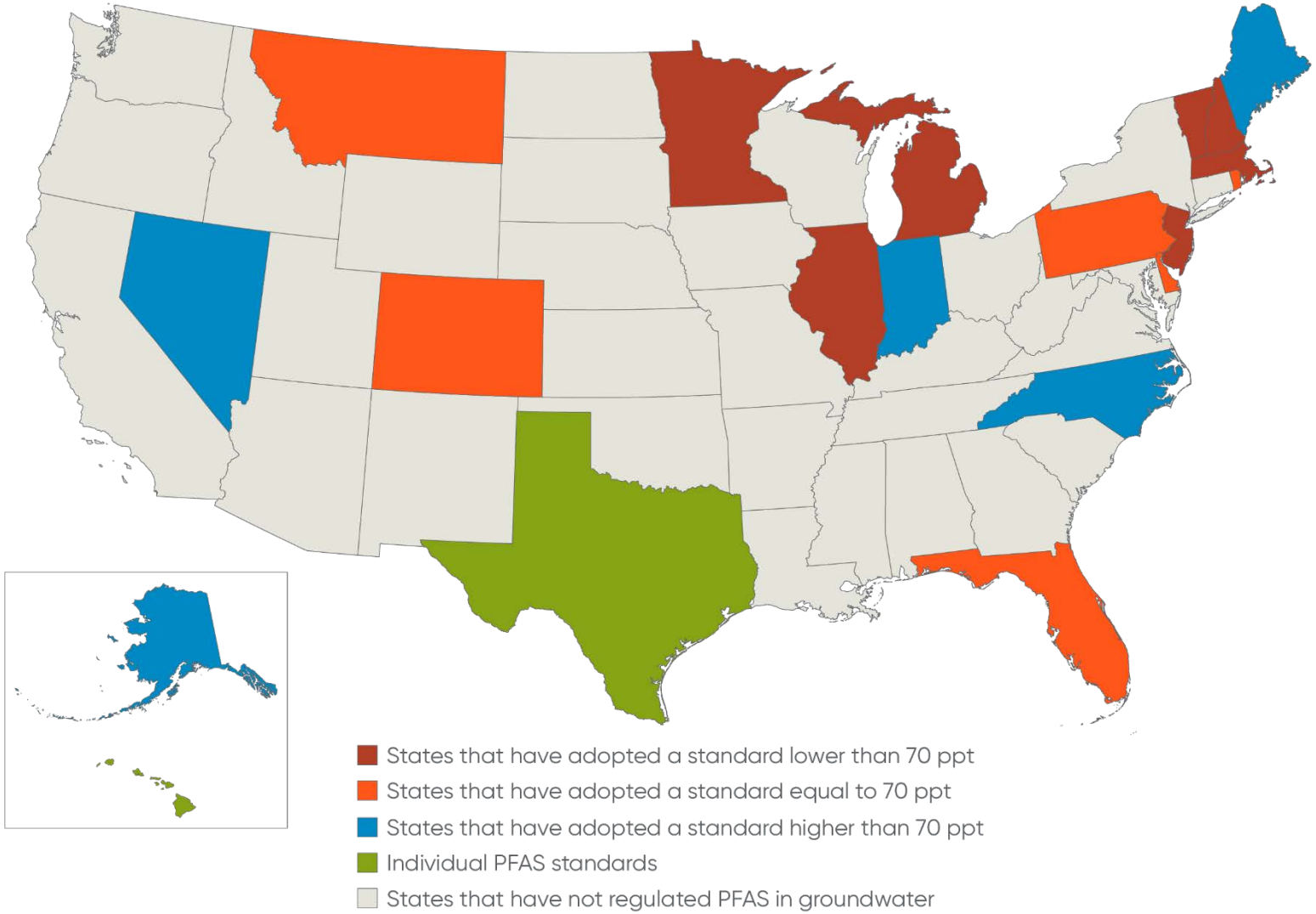
Evolving State Regulations

Mid-Atlantic Region

- Delaware
- Maryland
- New Jersey
- Pennsylvania
- Virginia

C.P. Crane, Middle River, MD (from: March 15, 2022 – C.P. Crane Towers Demolition in June – Forsite Development (forsiteinc.com))

PFAS GROUNDWATER REGULATIONS



The information is current as of April 20, 2022

From Bryan Cave Leighton Paisner LLP.

States PFAS Groundwater Regulation Map

Civil & Environmental Consultants, Inc.

August 2022

Standards and guidance values for PFAS in groundwater, drinking water, and surface water/effluent (wastewater).

This Table belongs with the ITRC PFAS Technical and Regulatory Guidance Document. The values included here were confirmed to be in use as of the end of the calendar month for which this table is prepared. These values are changing rapidly. The ITRC intends to update this table periodically as new information is gathered. The user is encouraged to visit the ITRC PFAS web page (http://pfas-1.itrcweb.org) to access the current version of this file. Please see ITRC Disclaimer http://pfas-1.itrcweb.org/about-itrc/#disclaimer

						PFAS Analyte Concentration (µg/L) and CAS RN							
						PFOA	PFOS	PFOS-K	PFNA	PFBS	PFHxS	HFPO-DA (Gen-X)	CIPFPECA
Location	Agency / Dept	Standard / Guidance	Type	Promulgated Rule (Y/N/O)	Footnote	335-67-1	1763-23-1	2795-39-3	375-95-1	375-73-5	355-46-4	HFPO-DA (Gen-X)	CIPFPECA
U.S. Environmental Protection Agency													
USEPA	Office of Water	HA	DW	N						2		0.01	
	Office of Water	Interim HA	DW	N	a	0.000004	0.00002						
	Regions	RSL	DW/GW	N	b	0.060	0.040	0.040	0.059	6.0	0.39	0.06	
	OLEM	Interim Recommendation	GW	N	m	0.040	0.040						
U.S. States													
Delaware (DE)	DNREC	RL	GW	N	a	0.070	0.070						
	DNREC	SL	GW	N	a	0.070	0.070						
Maryland (MD)	DOH	HA	DW	N							0.140		
New Jersey (NJ)	DEP	GWQS	GW	Y, N	p, bb	0.014	0.013		0.013				0.002
	DEP	MCL	DW	Y	p	0.014	0.013		0.013				
Pennsylvania (PA)	DEP	MSC	GW	N	a, x	0.070	0.070			10			

Notes:

The following states may use the EPA Health Advisories as a basis for environmental action but do not yet have published criteria: Alabama (AL), Arizona (Az), Idaho (ID), Kansas (KS), Kentucky (KY), Nebraska (NE), West Virginia (WV) and Wyoming (WY).

Promulgated (Yes/No/Other)- Values are considered promulgated if they have been finalized into law or if the table of values is referenced in supporting law. Values are not considered promulgated when they are not finalized into law, but are listed here as they are considered final guidance and are confirmed to be in use by the applicable state. Values identified as "other" include those that are proposed, considered draft, or recommended, but not yet finalized and confirmed to be in use by the applicable state. **Refer to "Water Pending Criteria" for proposed values**.

"Year Last Updated" refers to the year in which any regulated PFAS value listed within the specified standard or guidance (column F) was last updated. If different PFAS compounds were updated in different years, only the most recent update year is shown. However, references are provided separately for the most recent publication or adoption date of the individual PFAS compound values. If a reference is updated without a change in PFAS values, the date of the most recent reference is shown.

a Applies to the individual results for PFOA and PFOS, as well as the sum of PFOA + PFOS.

b Regional Screening Level (RSL) as presented in the USEPA Regional Screening Level (RSL) Summary Table (TR=1E-06, HQ=1) November 2014 through May 2022. Note: RSL users screening sites with multiple contaminants should consult the USEPA (2020) RSL User's Guide and USEPA (1989) Risk Assessment Guidance. Potassium salts of PFBS and PFOS have values identical to PFBS and PFOS.

m Interim screening level for groundwater at sites contaminated with PFOS and PFOA, based on target hazard quotient of 0.1

p PFOA and PFOS MCLs were first proposed by NJDEP in 2017 and 2018, and were both adopted in 2020. PFNA MCL was proposed in 2015 and adopted in 2018.

x Pennsylvania MSCs are reported in the table for aquifers used for residential purposes with a total dissolved solid (TDS) value less than or equal to 2500 mg/L. If TDS exceeds 2500 mg/L, the values are multiplied by a factor of 100.

bb ISGWQC are enforceable standards established by NJDEP by posting on Interim Ground Water Quality Standards table.

August 2022

Residential soil standards and guidance values for PFAS.

This Table belongs with the ITRC PFAS Technical and Regulatory Guidance Document. The values included here are changing rapidly and include only residential exposure values. Industrial and commercial values may be available, but are not presented here. The ITRC intends to update this table periodically as new information is gathered. The user is encouraged to visit the ITRC PFAS web page (http://pfas-1.itrcweb.org) to access the current version of this file. Please see ITRC Disclaimer http://pfas-1.itrcweb.org/about-itrc/#disclaimer

		Soil Screening Levels and/or Standards for Groundwater and Surface Water Protection (mg/kg) .		Human Health Soil Screening Level (mg/kg)	
			U.S States	U.S.	U.S. States
Agency		USEPA	Pennsylvania	USEPA	Delaware
Department		Regions	DEP	Regions	DNREC
Year Last Updated		2022	2021	2022	2016
Standard		RSL[a]	MSC[o]	RSL[a]	
PFAS	CAS RN		Residential, Used Aquifers, TDS ≤ 2500 mg/L		
PFNA	375-95-1	0.000247	--	0.19	--
PFOA	335-67-1	0.000915	0.007	0.19	0.13
PFOS	1763-23-1	0.000038	0.007	0.13	0.13
PFOS-K	2795-39-3	--	--	0.13	--
PFBA	375-22-4	--	--	--	--
PFBS	375-73-5	0.00194	1	19	--
PFPeA	2706-90-3	--	--	--	--
PFHxS	355-46-4	0.000167	--	1.3	--
HFPO-DA (Gen-X)	132522-13-6	--	--	0.23	--

Notes:

a. Regional Screening Level (RSL) as presented in the USEPA Regional Screening Level (RSL) Summary Table (TR=1E-06, HQ=1) November 2014 through May 2022. Note: RSL users screening sites with multiple contaminants should consult the USEPA (2020) RSL User's Guide and USEPA (1989) Risk Assessment Guidance.

o. Pennsylvania MSCs are reported in the table for aquifers used for residential purposes with a total dissolved solid (TDS) value less than or equal to 2500 mg/L. If TDS exceeds 2500 mg/L, the values are multiplied by a factor of 100.

August 2022

UPDATES Standards and guidance values for PFAS in groundwater, drinking water, and surface water/effluent (wastewater).
This Table belongs with the ITRC PFAS Technical and Regulatory Guidance Document. The information presented below represents anticipated or pending updates we are aware of as of the end of the calendar month for which this table is prepared. The ITRC intends to update the Water Table as the anticipated or pending values are finalized and/or made available for use by the issuing body. The user is encouraged to visit the ITRC PFAS web page (http://pfas-1.itrcweb.org) to access the current version of this file.
Pending as of August 31, 2022

Date Added to Pending List	State/Country	Author/Agency	Pending Action	Website Source	Draft Document
Nov-18	U.S.	ATSDR	Minimal Risk Levels (MRLs) and Environmental Media Evaluation Guides (EMEGs) for PFAS identified pending finalization of draft toxicological profile	https://www.atsdr.cdc.gov/pfas/mrl_pfas.html	
Feb-19	U.S.	EPA	PFAS Action Plan including development of Maximum Contaminant Levels (MCL) for PFOA and PFOS	https://www.epa.gov/sites/production/files/2019-02/documents/pfas_action_plan_021319_508compliant_1.pdf	EPA's Per-and Polyfluoroalkyl Substances (PFAS) Action Plan, February 2019.
Apr-19	U.S.	EPA	Draft interim recommendations for (1) screening level set to Hazard Quotient of 0.1 for PFOA or PFOS individually, which is currently 40 ng/L (0.040 µg/L), and (2) use of the USEPA HA for PFOA and PFOS of 70 ppt (0.070 µg/L) as the preliminary remediation goal (PRG) for groundwater that is a current or potential source of drinking water, where no state or tribal MCL or other ARARs exist.	https://www.epa.gov/pfas/draft-interim-recommendations-addressing-groundwater-contaminated-pfoa-and-pfos	https://www.epa.gov/sites/production/files/2019-04/documents/draft_interim_recommendations_for_addressing_groundwater_contaminated_with_pfoa_and_pfos_public_comment_draft_4-24-19.508post.pdf
Jun-19	Florida	DEP	Provisional cleanup target levels for PFOS/PFOA in soil groundwater; development of surface water screening levels; consideration of other PFAS compounds. Florida intends to establish additional regulations if EPA has not done so by January 2025. **Update 08/2022** Florida Department of Environmental Protection, Division of Waste Management issued a *PFAS Dynamic Plan* in March 2022 outlining actions noted above.	https://floridadep.gov/waste/district-business-support/content/contaminated-media-forum; https://floridadep.gov/sites/default/files/Dynamic_Plan_March_2022.pdf	Chapter 62-780.150 and 62-780.650
Jun-19	Wisconsin	DHS	Recommended groundwater enforcement standards and preventive action limits for PFOA (20 ng/L) and PFOS (20 ng/L) individually or combined.	https://www.dhs.wisconsin.gov/water/gws.htm ; https://dnr.wi.gov/topic/contaminants/PFAS.html	
Jul-19	Alaska	DEC	The proposed amendments for establishing GW cleanup levels for PFBS, PFHpA, PFHxS, PFNA, PFOS and PFOA are on hold indefinitely by the department pending further action by EPA. Public comment period closed November 2018.	http://dec.alaska.gov/spar/regulation-projects/pfas-cleanup-level-amendments/	18 AAC 75, Oil and Other Hazardous Substances Pollution Control, Public Comment Draft, October 1, 2018
Nov-20	Wisconsin	DHS	Wisconsin DHS provided recommended groundwater standards to Wisconsin DNR for FOSA, GenX, NEtFOSE, PFBA, FBS, PFDoA, PFHxA PFTeA, PFUnA, ADONA, PFODA, PFHxS, PFNA, PFDA, NEtFOSA and NEtFOSAA. WDNR will consider these for rulemaking.	https://www.dhs.wisconsin.gov/water/gws-cycle11.htm	
Jan-21	California	OEHHA	The California Office of Environmental Health Hazard Assessment (OEHHA) provided a recommended Drinking Water Notification Level for PFBS of 0.5 ug/L to the California Water Board for their consideration	Notification Level Recommendation for Perfluorobutane Sulfonic Acid in Drinking Water	
Jan-21	Virginia	BOH	VA Board of Heatlth (BOH) to adopt MCLs for PFOA, PFOS, and other PFAS. Delayed effective date of 1/1/2022	https://lis.virginia.gov/cgi-bin/legp604.exe?201+sum+HB1257&201+sum+HB1257	
Jul-21	California	OEHHA	The California Office of Environmental Health Hazard Assessment (OEHHA) provided a draft Public Health Goals for PFOA (0.007ug/L) and PFOS (1ug/L) in drinking water for consideration.	https://services.statescape.com/RegsText/StaticDownloads/214006_363325.pdf	
Oct-21	New York	NYSDEC	Guidance Values for Raw Water (6.7 ng/L for PFOA and 2.7 ng/L for PFOS) and Aquatic Life protection (freshwater and saline) released for public comment	DEC Releases DRAFT Guidance Values to Advance New York State's Regulation of Emerging Contaminants PFOA, PFOS, and 1,4-Dioxane - NYS Dept. of Environmental Conservation	
Nov-21	Pennsylvania	PADEP	Proposed MCLs for PFOA (14 ng/L) and PFOS (18 ng/L). The proposed rule is expected to be published in the PA Bulletin in early 2022 for a 60-day public comment period.	https://www.ahs.dep.pa.gov/NewsRoomPublic/articleviewer.aspx?id=22025&typeid=1	
Feb-22	Wisconsin	DNR	Groundwater standards proposed in November 2021 were not approved.	NR 140 Groundwater Quality Standards Update | | Wisconsin DNR	
Mar-22	California	OEHHA	The California Office of Environmental Health Hazard Assessment (OEHHA) provided a recommended Drinking Water Notification Level for PFHxS of 2 ng/L.	Notification Level Recommendation for Perfluorohexane Sulfonic Acid (PFHxS) in Drinking Water - OEHHA	
Jun-22	North Carolina	DEQ	Action Plan to develop Groundwater standards by Summer/Fall 2022, Surface Water standards and Drinking Water standards by Fall/Winter 2022-2023 for PFOA, PFOS, GenX, PFBS, PFBA.	https://deq.nc.gov/media/30108/open	
Jun-22	Rhode Island	DEM	Promulgate surface water and groundwater quality standards for PFOA, PFOS, PFHxS, PFNA, PFHxA, and PFDA on or before 12/31/2023.	https://legiscan.com/RI/text/H7233/2022	
Aug-22	Delaware	DHSS	Proposed of MCLs for PFOA (21 ppt), PFOS (14 ppt), and the cumulative of both (17 ppt).	https://regulations.delaware.gov/register/august2022/proposed/26 DE Reg 95 08-01-22.htm	
Aug-22	U.S.	EPA	In April 2022, EPA proposed aquatic life criteria for PFOA (freshwater acute 49 mg/L and chronic 0.094 mg/L) and PFOS (freshwater acute 3.0 mg/L and 0.0084 mg/L chronic).	https://www.epa.gov/wqc/aquatic-life-criteria-perfluorooctanoic-acid-pfoa; https://www.epa.gov/wqc/aquatic-life-criteria-perfluorooctane-sulfonate-pfos	https://www.epa.gov/system/files/documents/2022-04/pfoa-report-2022.pdf; https://www.epa.gov/system/files/documents/2022-04/pfos-report-2022.pdf

Developing Federal Regulation

- December 2020 – PFAS Added to TRI Reporting Requirements
- October 2021 – EPA PFAS Strategic Roadmap
  - Overview of intended actions
- April 2022 – NPDES Guidance Memo for Federally-Issued Permits
  - Restrict PFAS discharges to water bodies
- August 2022 – CERCLA Hazardous Substance Designation
  - Proposed designation for PFOA and PFOS
- In The Works…
  - RCRA – Potential for designation as hazardous waste
  - TSCA – Data gathering on manufacture or import of PFAS-containing products.

Toxic Release Inventory

PFAS TRI Reporting Requirements

- 2020 – 172 PFAS compounds added to TRI reporting requirements for reporting year 2021.
- 2021 – 4 more PFAS compounds added for reporting year 2022
- 2022 – 5 more PFAS compounds added for reporting year 2023

Federal NPDES Permits

NPDES Guidance Memo

- Requirements for Federally-permitted facilities with PFAS substances expected or likely to be in discharge
  - Periodic effluent monitoring
  - Best Management Practices
    - Product elimination
    - Spill prevention
    - Equipment decontamination
    - Source inventory and reduction strategy
- Listing of industries that may discharge PFAS substances – EPA Strategic Roadmap

CERCLA Hazardous Substance

PFOA and PFOS as Hazardous Substances

- Applicability to operations
  - No expected exemptions based on industry
- Reportable quantity (RQ) and emergency response implications
  - Proposed RQ = 1.0 lb in 24-hrs
- Potential trigger for investigation or reopening of closed sites
  - New, existing or closed NPL sites
- Potentially Responsible Party
  - Direct or indirect exposure to liability and litigation

Risk Management Strategies

Example Case

Considerations for the Assessment of Risk and Development of Strategies for Aqueous Film-Forming Foam (AFFF)

PFAS in Fire Fighting Foams

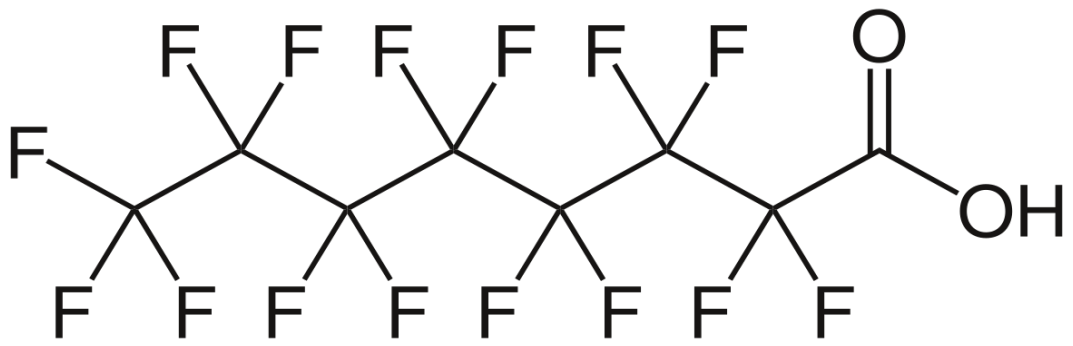
CHEMGUARD Ultraguard

15.3. US State Regulations

California Proposition 65

This product contains the following Proposition 65 chemicals

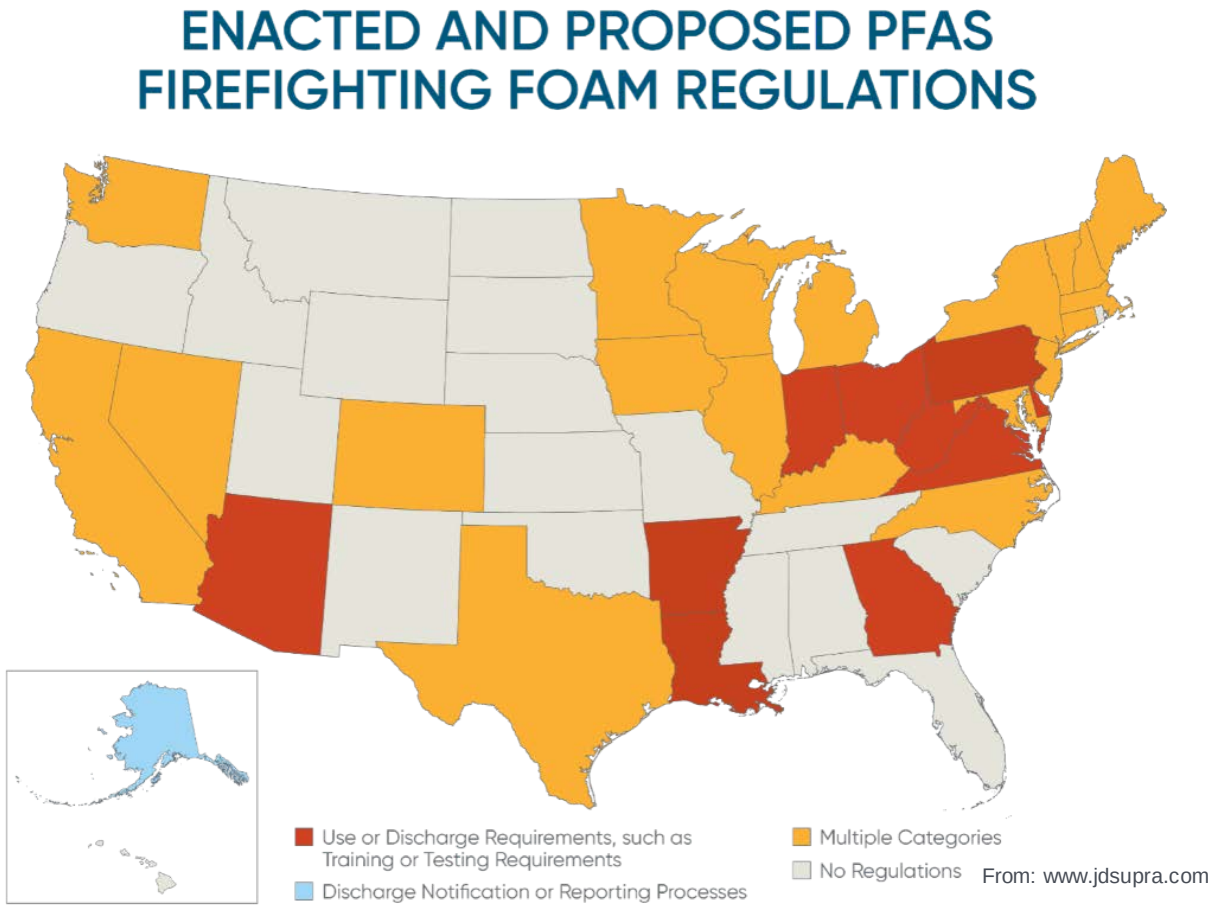
Chemical name	California Proposition 65
Formaldehyde - 50-00-0	Carcinogen
Perfluorooctanoic acid - 335-67-1	Developmental Toxicity



Courtesy of Chemguard SDS

Civil & Environmental Consultants, Inc.

Enacted and Proposed PFAS Foam Regulations



AFFF System Management

- BMPs should consider the entire life cycle for AFFF
  - Do Fluorine Free Foam (F3) alternatives meet site-specific performance requirements
  - Site-specific evaluation of likely fire hazards and potential risks for life, public safety, and property
  - Potential environmental, human health, and financial liabilities associated with AFFF releases
  - Site constraints, including existing equipment retrofit requirements, to adapt to alternate foams

ITRC, 2020

BMPs for AFFF

Storage

- Develop foam inventory
- Designate transfer areas for foam concentrate
- Maintain foam system to prevent accidental discharges
- Ensure containers are compatible with foam (corrosion)
- Do not mix foam types in your system

BMPs for AFFF

Planning and Mitigation

- Prepare run-off collection plans
- Create mitigation plans for uncontrolled releases
- Quickly clean up contaminated environmental media if release occurs
- Prioritize education, training and preplanning

From: www.integratedfiresystems.com

On-Site Storage

Current and Future Requirements

- PFAS Materials Will Eventually Need to be Managed as a Hazardous Substance
  - Containment
  - Inspections
  - TRI Reporting (TSCA) – 179 compounds require reporting during 2022.
  - Tier II Reporting (EPCRA)

Source: mllve.com

Disposal Strategy

Business Considerations

- Cost of Disposal Now vs. Cost of Future Disposal as a Hazardous Substance
- Risk of Storage On-Site vs. Cost of Disposal
- Limited Options for Disposal
  - Incineration, Deep Well Injection, Select Landfills

Release Investigation

Requirements Will be Variable

- Spillage
- Fire Training
- Fire System Discharges
- Air Deposition

Impacted Soil and/or Groundwater?

- Cost of Understanding Extent of a Release Now vs. Being Mandated in the Future under CERCLA/RCRA or State Programs
- Requirements Vary by Location

Due Diligence

Property Evaluations During M&A

- PFAS is not currently a REC Under ASTM-1527
  - Consider if state has declared PFAS to be a hazardous substance
  - Will become a REC under ASTM-1527 when USEPA declares PFAS to be a hazardous substance
- PFAS Evaluated as a Business Risk
- Requires Additional Review of Process and Inventory Files and Materials on Site to Evaluate for PFAS

Take Home Message

Regulatory Developments Ongoing

- Evolving regulatory environments at the state and Federal levels
- Drastically different criteria being developed
- Likely to be required to provide additional information
  - Sampling, inventory, historical records
  - Likely will not be limitations at first
- Expect limits, BMPs, reporting likely

Guidance and Regulations

- Details will matter
- States programs may evolve to follow Federal lead

Take Home Message

Strategic Considerations

- Not one clear answer
- Identify business risks
- Operations subject to state regulatory lead vs. Federal
- Cost of disposal now vs. later
- Implications on environmental due diligence

Developing Strategy

- Identify legacy and current exposures
- Plan for mitigation of risks
- Consider the evolving nature of regulatory environment

Questions?

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