



Session F2:

Emerging Contaminants

Moderator:

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Speakers:

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Substances Control

27th California Unified Program Annual
Conference

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**Tamarin
Austin**

Austin Clean Water Advisors, Inc.



**Olivia
Molodanof**

Hogan Lovells



**Jon
Rohrer**

Roux



**Cheryl
Prowell**

Dept. Toxic Substances Control

STOP NEMATODES —FUMIGATE—

**With FUMAZONE® or NEMAGON®
For Increased PROFIT From Increased
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2) WATER RUN or

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An advertisement clipped from the April 18,
1965 issue of The Fresno Bee.

Dow Chemical Is Trying to Recall Supplies of a Suspected Pesticide

New York Times, Aug. 26, 1977



Lathrop became known as the first major episode of worker infertility related to occupational exposure to DBCP. In 1977, workers at a production plant noticed that they were unable to father children.

EJAtlas.org



DBCP

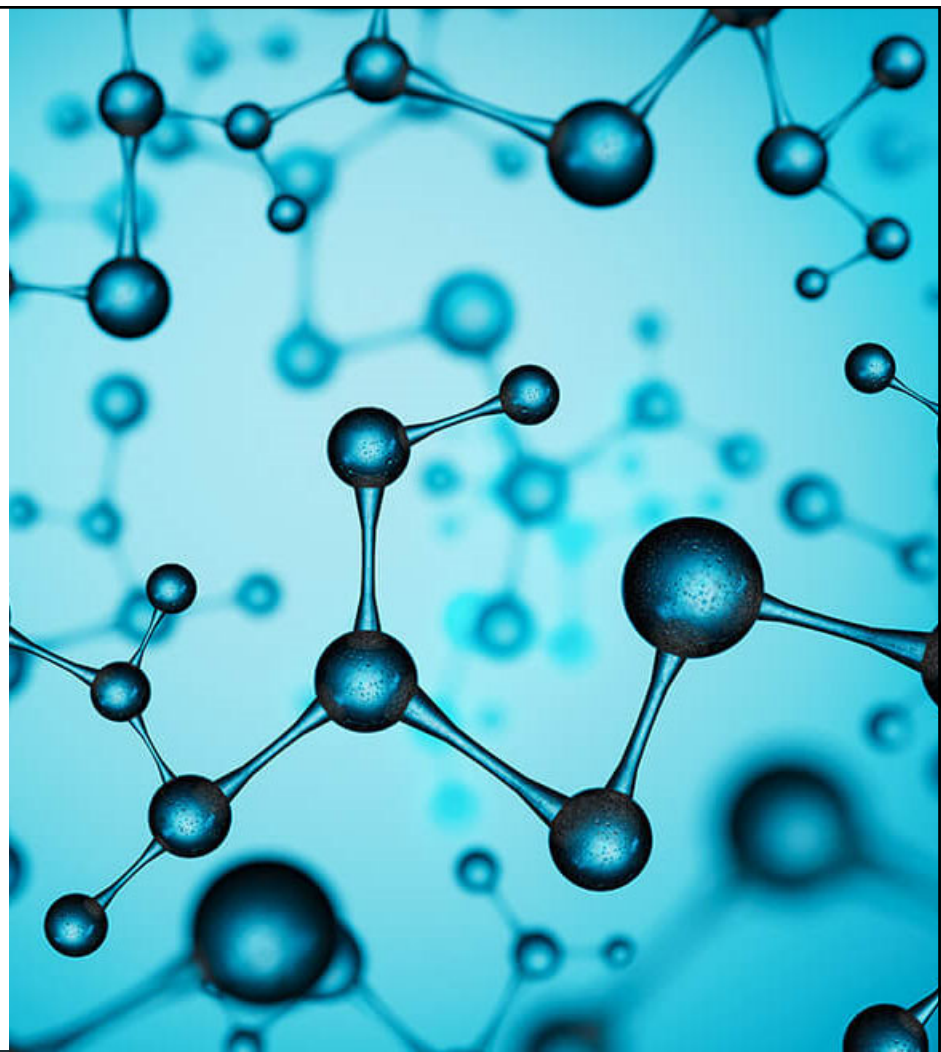
- 1977 Employees at Occidental Chemical Plant found sterile due to DBCP exposure
- 1977 U.S. banned sales of DBCP but sales continued abroad
- 1983 \$4.9 million judgment against Dow on behalf of Occidental employees
- 1990s Nicaraguan banana worker lawsuits
- 2006 \$805 million awarded in compensation
- 2009 Florida court denied recognition of a \$97 million judgment against Dow and Dole
- 2009 California court threw out lawsuits against Dow and Dole
- 2018 Plaintiffs sought to enforce judgments in France
- 2022 French court found Nicaraguan courts had no jurisdiction

What Are Contaminants of Emerging Concern?

- Potential risk to human or ecological health
 - Previously unknown or not well understood
 - Unregulated
 - Unmonitored
 - No enforceable or evolving standard
 - Absence of analytical methods for detection
- Phthalates
 - Arsenic
 - Perchlorate
 - Nonylphenols
 - Synthetic Musks
 - Personal Care Products
 - Pharmaceuticals
 - Flame Retardants
 - Bisphenol-A
 - Industrial Chemical Additives, Stabilizers and Adjuvants

Agenda

- Chemicals/Agents:
 - Microplastics (MP)
 - Ethylene Oxide (EO)
 - 6PPD-Quinone
 - Phthalates
- What is it?
- Sources
- Potential exposures and human health effects
- Environmental effects
- Data gaps, scientific issues
- Status of litigation
- Current regulatory status

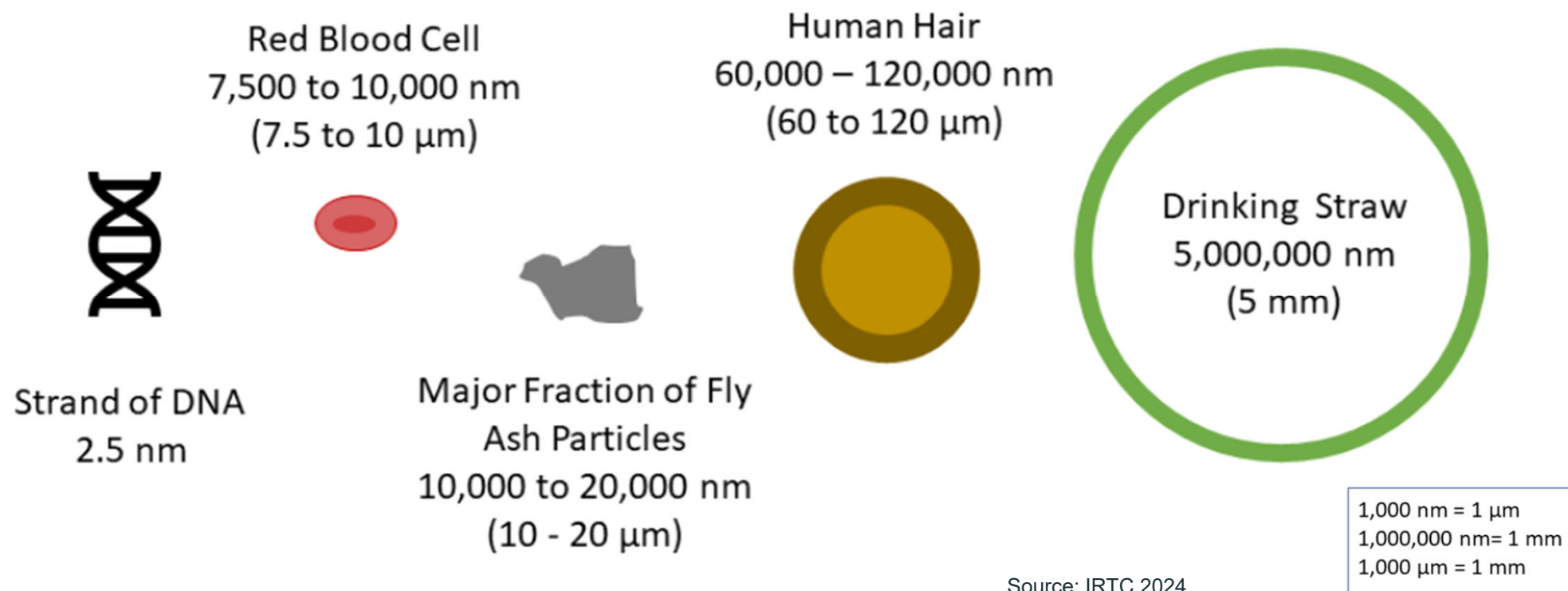


Microplastics



Source: National Geographic

What are Microplastics?

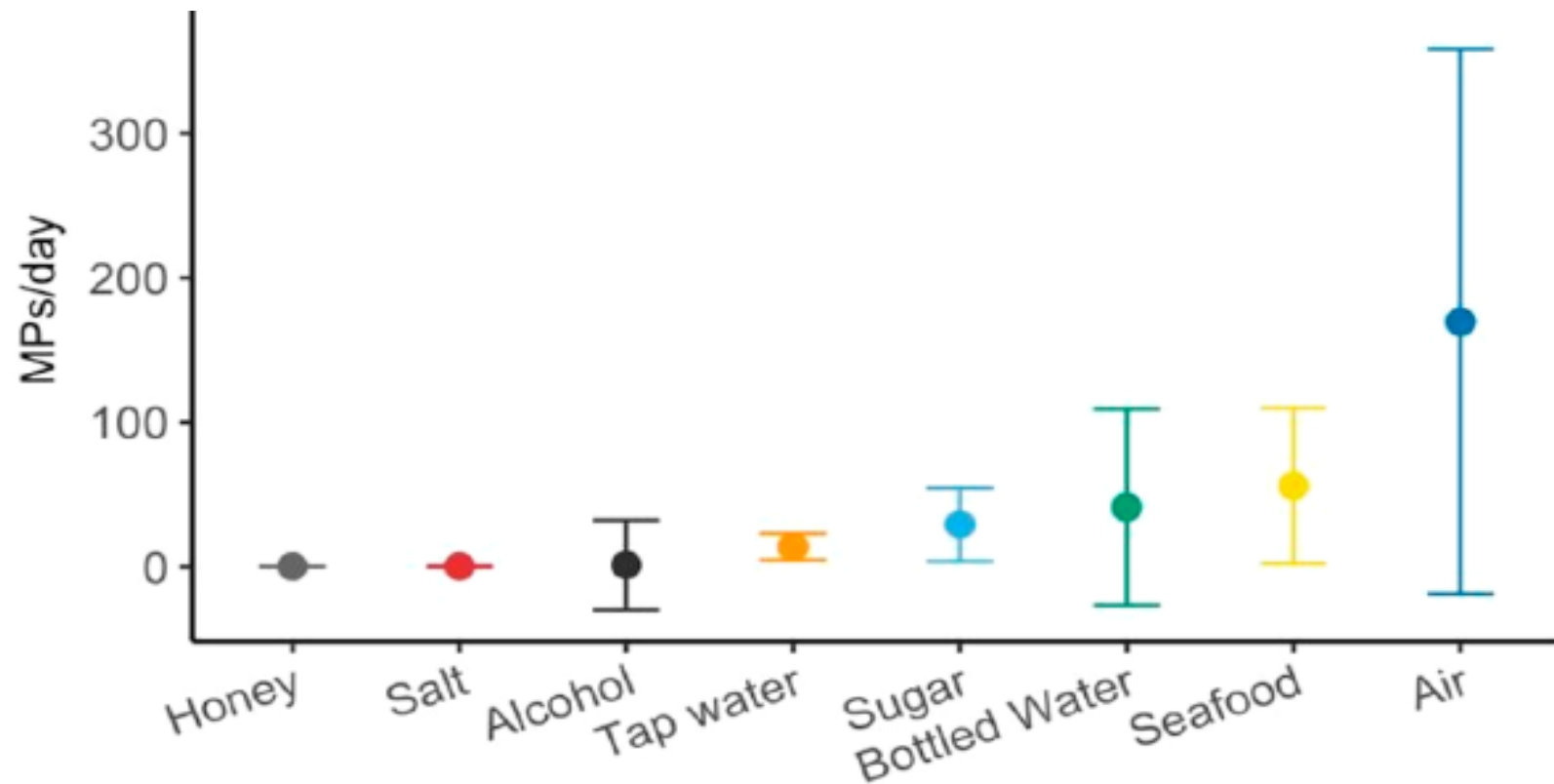


Sources of Microplastics

- Intentionally added Sources
 - Personal care products
 - Cosmetics
 - Pharmaceuticals
 - Detergents
 - Insecticides
 - Clothing
 - Industrial waste and activities
- Degradation of larger polymers (secondary microplastics)
 - Fishing gear
 - Plastic bottles/food containers/bags
 - Biosolids



Human Exposures to Microplastics



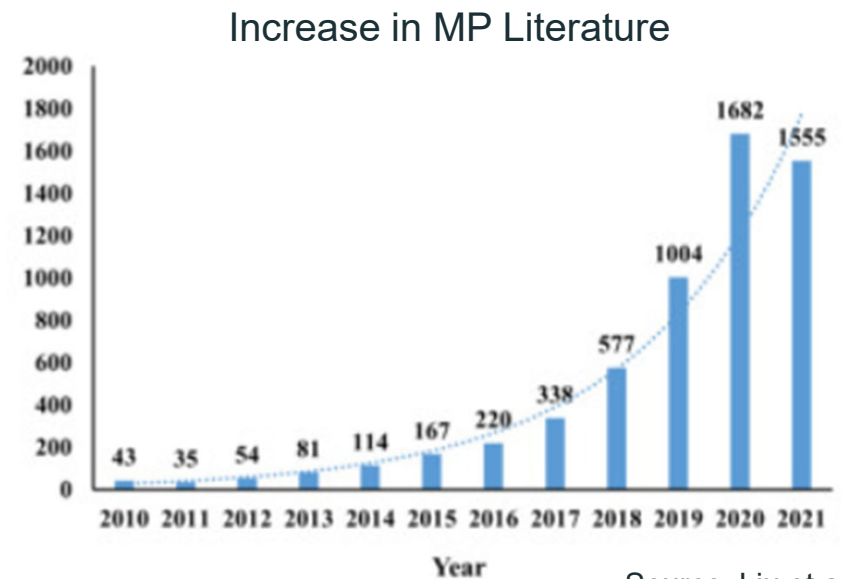
Source: Cox et al., 2019

Microplastics: Health and Ecological Effects

- Found in human organs and tissues, as well as breast milk and recently the brain
- Limited information: possibly respiratory, immune, and digestive/excretory effects
- Many studies underway
- Aquatic species
 - Smaller particles = cellular damage
 - Large particles = obstruction/injury

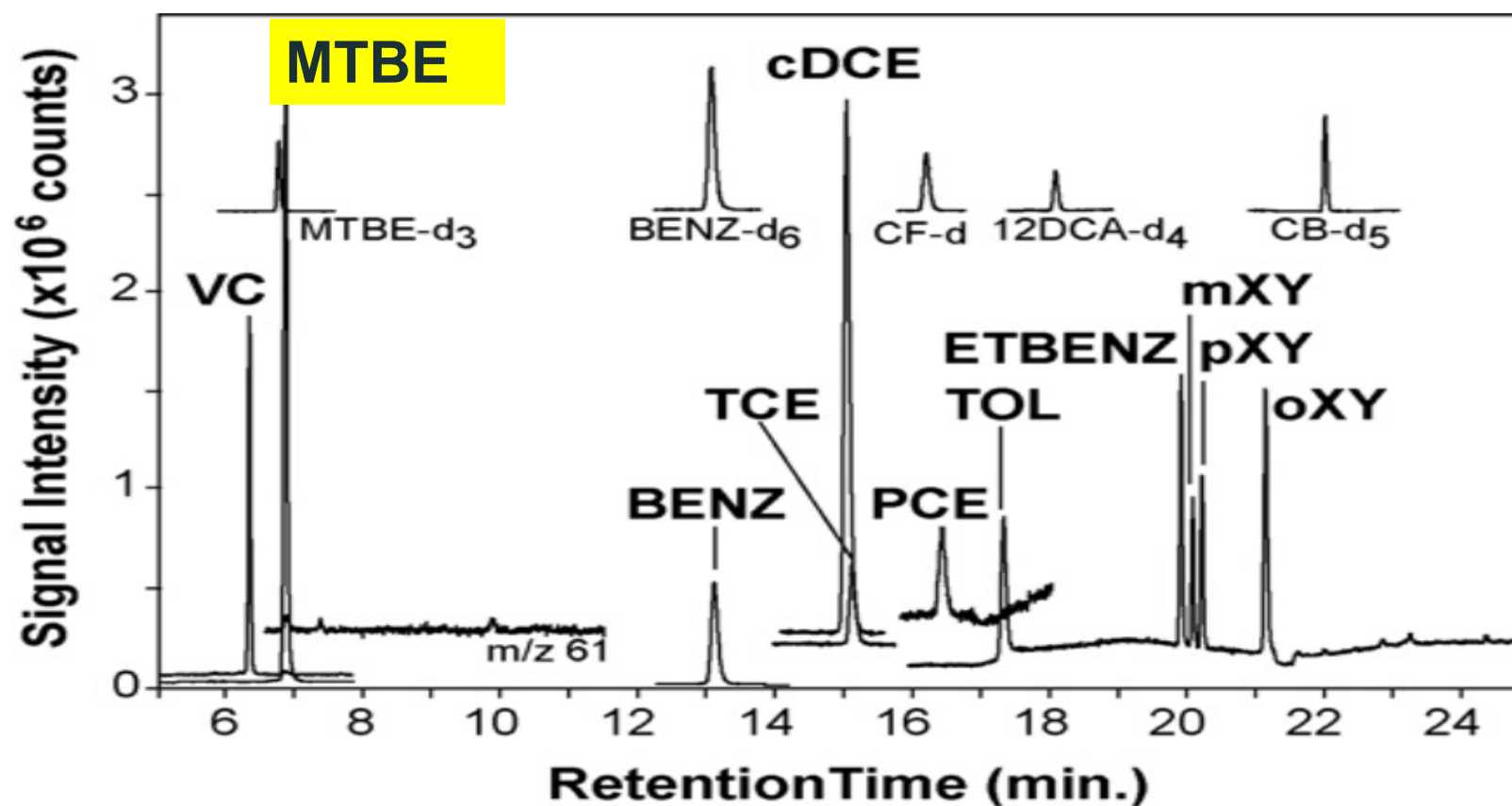
Microplastics: Challenges

- Limited data on health effects: possibly respiratory, immune, and digestive/excretory effects
- Effects on aquatic species: cellular damage, obstruction/injury
- Can be a carrier for other chemicals
- Microplastics are widespread
- Difficult to study



Source: Liu et al. 2023.

Regulating Emerging Contaminants



Michael Berg Fig. 6

Microplastics: Regulations

- 2018: SB1422 Required Water Board to develop analytical methods
- 2022: SWRCB Policy Handbook
- October 2023: EU Restriction of microplastics <5mm on own or intentionally added to mixtures (e.g., glitter, detergents, cosmetics, agriculture products)
- 2015: Microbead-Free Waters Act (U.S. FDA), prohibits products containing microbeads for human use
- SB 54: California law requiring all packaging to be recyclable or compostable by 2032



Could also include HR 2238 introduced to congress – requirements and incentives to reduce plastic production and increase recycling...

Microplastic Litigation Trends

Federal Citizen Suits

Private party lawsuits alleging violations of Federal statutes including the Clean Water Act and RCRA resulted in microplastics pollution/contamination

eNGO Nuisance Suits

eNGO lawsuits in state court alleging common law tort claims, e.g., public nuisance, defective product, negligence, and failure to warn about product's microplastics impacts

Gov't Nuisance Suits

City and state lawsuits alleging that manufacturing/sale of products proximately caused nuisance of plastic packaging with microplastics discarded by third parties

eNGO Policy Suits

eNGO lawsuits challenging EPA approvals, e.g., "impaired waters" list under the Clean Water Act failed to consider impacts of plastic pollution/microplastics

Class Action Suits

Miller et al. V. Handi-Craft Company, Inc., No. 4:24-cv-03782 (N.D. Cal. Filed Jun. 25, 2024): A class of California consumers filed suit against a company that manufactures plastic baby bottles and sippy cups, arguing that the company failed to warn consumers that the bottles/cups leached microplastics when heated and mislead consumers by advertising the bottles/cups as "BPA free"

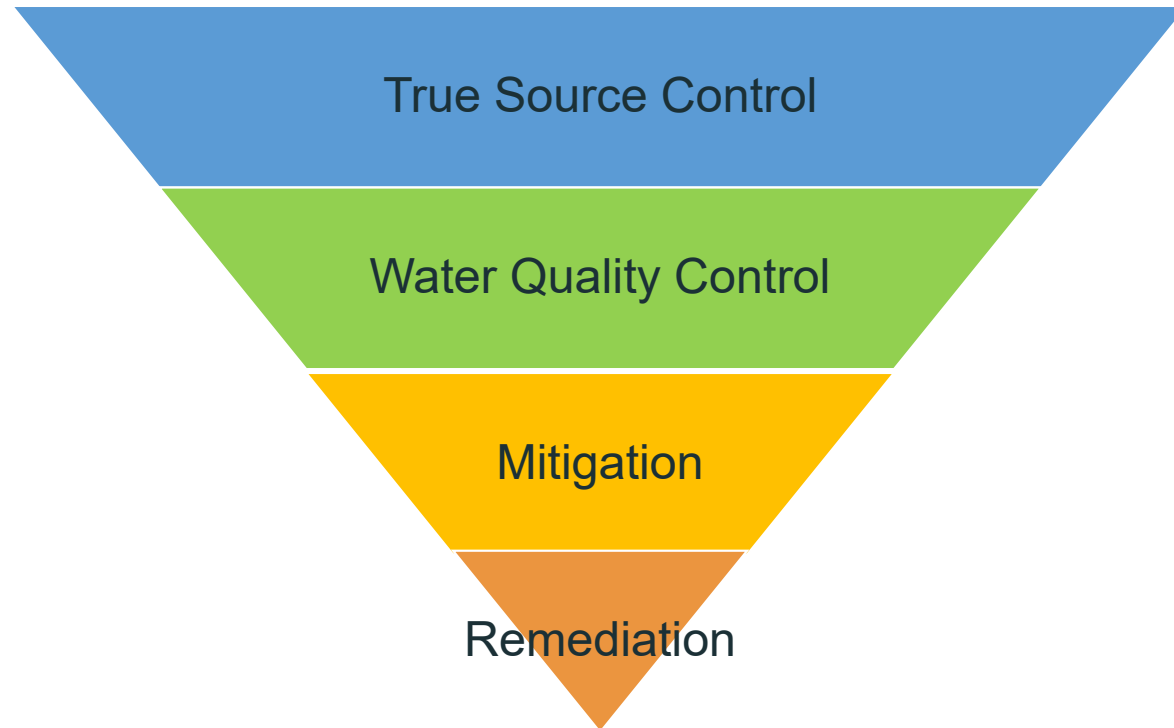
How Do We Address Microplastics?

CEC Management Approach

Most Preferred



Least Preferred



DTSC's Safer Consumer Products

Candidate Chemical List

Chemicals listed as a concern by Authoritative Bodies

Priority Products

Product-Chemical combinations that may cause harm

Alternatives Analysis

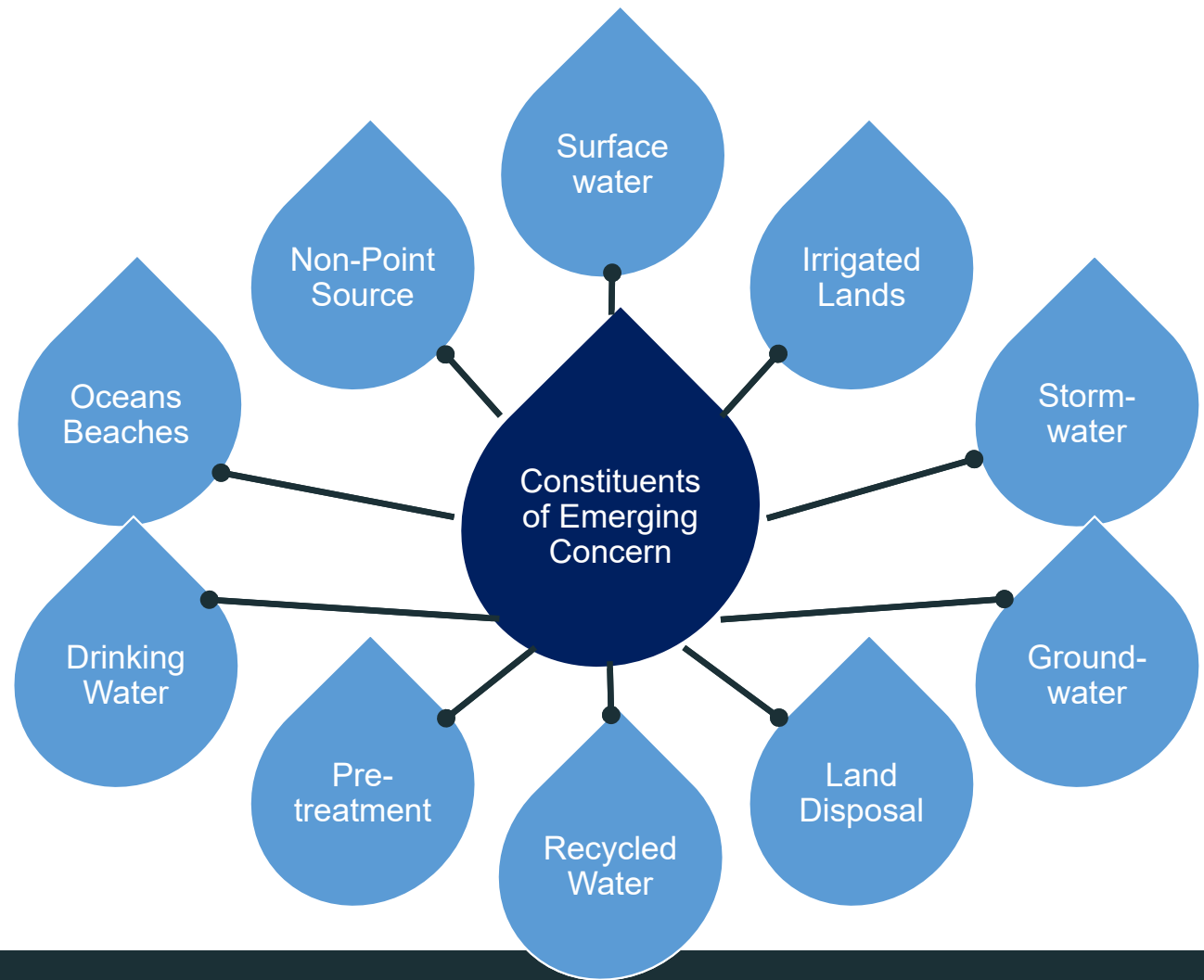
Manufacturer evaluation of safer alternatives

Regulatory Response

Wide range of possible actions to protect human health and the environment



CEC Program – Holistic Approach





- **Water Code 13267** requirement to investigate
- **Water Code 13304** “authorizes Regional Water Boards to require **complete cleanup of all waste discharged** and restoration of affected water to background conditions....”
- **Water Code 13050(m)** defines nuisance



Ethylene Oxide

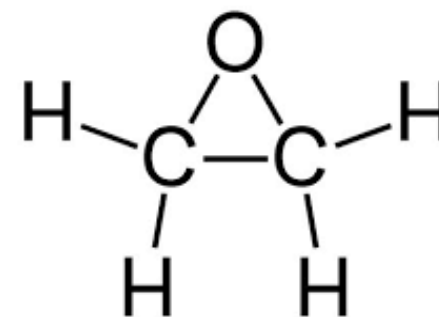
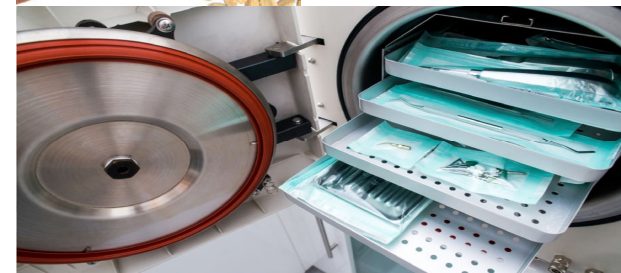
What is EO?

Physical Properties

- Colorless, flammable gas
- Sweet odor (at > 400 ppm)
- Air exposure pathway of concern
- Highly reactive – used to create other products
- Half-life in air 1 month to > 1 year
- Produced by the body

Uses

- Medical sterilization
- Fumigation of spices
- Ethylene glycol
- Polyurethanes
- Manufacturing lubricants, cleaners
- Household cleaners
- Personal care items
- Found in nature



How It Started



EPA/635/R-16/350Fa
www.epa.gov/iris

- EPA's 2016 IRIS Assessment:
 - Carcinogenic to humans by the inhalation route
 - Lymphatic cancers and breast cancer in women
 - 60 times more toxic than previous estimate
- EPA's Inhalation Unit Risk estimate (6.1 per ppm) results in "unacceptable risk" for >0.01 ppb in air
- Challenged by Texas DEQ (2020)

Evaluation of the Inhalation Carcinogenicity of
Ethylene Oxide

(CASRN 75-21-8)

In Support of Summary Information on the
Integrated Risk Information System (IRIS)

December 2016

National Center for Environmental Assessment
Office of Research and Development
U.S. Environmental Protection Agency
Washington, DC

The map displays the United States with 100 sampling locations for the NHANES survey. The locations are marked with black dots, blue dots, and black diamonds. The map includes state names, major cities, and geographical features like the Rocky Mountains and Appalachian Mountains.

What is Happening Now?

- California OEHHA (draft 2023)
- March 2024: EPA finalized National Emission Standards for Hazardous Air Pollutants (NESHAP) for ethylene oxide commercial sterilizers
- EO being regulated as one of the most potent carcinogens

OFFICE OF ENVIRONMENTAL HEALTH HAZARD ASSESSMENT

Air Toxics Hot Spots Program

Ethylene Oxide Cancer Inhalation Unit Risk Factor

Technical Support Document for
Cancer Potency Factors
Appendix B

April 2023 Draft



Air and Site Assessment and Climate Indicators Branch
Office of Environmental Health Hazard Assessment
California Environmental Protection Agency

Ethylene Oxide Litigation Trends

eNGO Challenges EPA on Policy

- Multiple lawsuits filed by eNGOs since 2020 under Clean Air Act
- Challenging EPA's position and/or inaction on ethylene oxide
- Synthetic organic chemical manufacturing industry (sterilization facilities)
- EPA entered Consent Decrees requiring promulgation of revised NESHAPs
- EPA published NESHAP on May 16, 2024 was promptly challenged

Personal Injury Claims

- Claims filed in multiple states
- Alleging that exposure to ethylene oxide emitted from sterilization facilities has caused cancer
- September 2022: Cook County jury awarded \$363 million to plaintiff who alleged cancer due to exposure
- Subsequent claims have been settled in other states

Recent Executive Action

- April 5, 2024 Ethylene Oxide Rule set standards to control emissions from sterilization facilities
- President Biden issued a Memorandum in January 2025 authorizing sterilizer facilities to request a waiver from limits on the use of ethylene oxide through HHS or EPA

How do we address EO?



6PPD-Q

What is 6PPD-Q?

6-PPD
(tire additive)



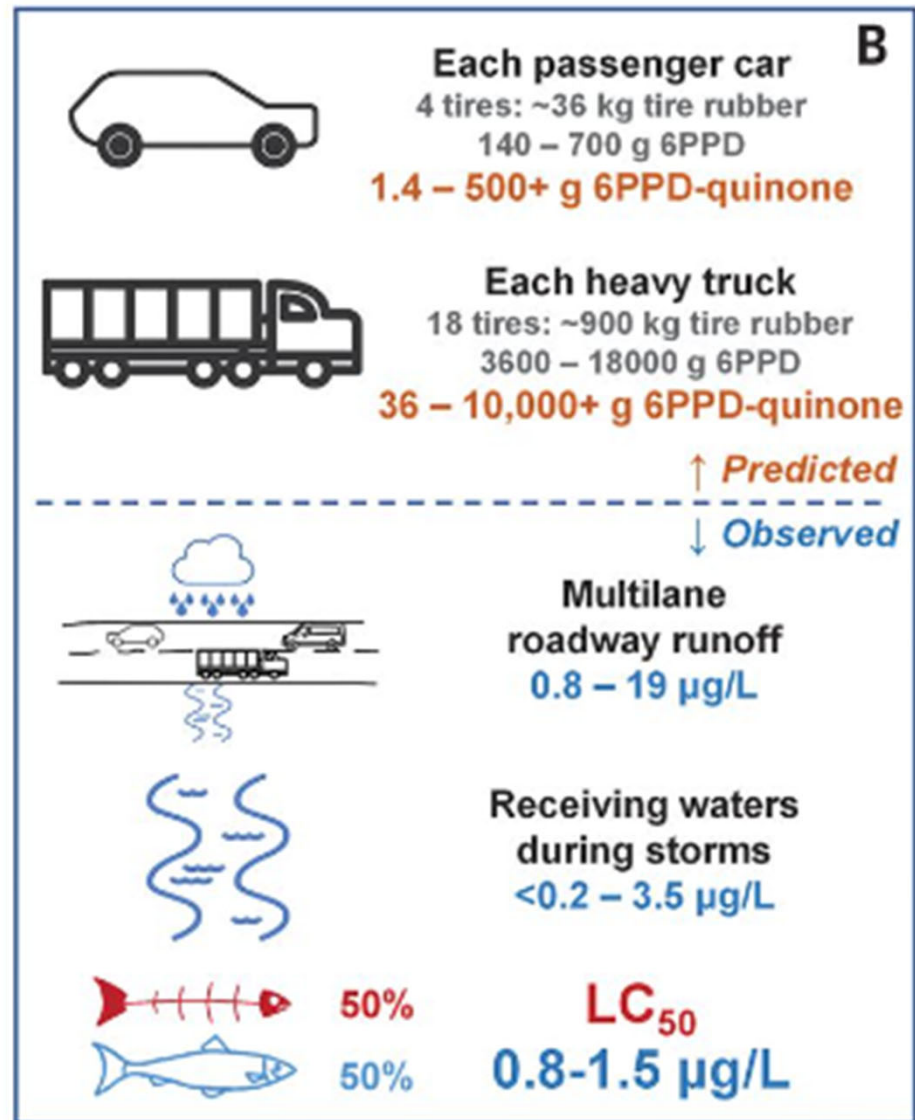
6-PPD-
Quinone
(byproduct)

N-(1,3-dimethylbutyl)-N'-
phenyl-p-phenylenediamine



University of Washington 2020

Source: Tian et al., 2020



6PPD – Rapid Opposition and Multi-Faceted Strategy

TSCA Petition

- Aug. 1, 2023: Coalition of Tribes petition EPA to prohibit 6PPD
- Nov. 2, 2023: EPA grants petition, issues advanced notice of proposed rulemaking, and plans to finalize rule requiring manufacturers to report on health studies

eNGO Threaten ESA Suits

- June 2023: Center for Biological Diversity sends ESA 60-day notice letter to Oregon and California state transportation agencies for failing to consider impacts to salmon from tire pollution due to road maintenance
- Lawsuit not yet filed

ESA Suit Filed

- Nov. 8, 2023: Institute for Fisheries Resources sues 13 tire manufacturers (N.D. Cal.)
- Alleges violations of Section 9 of the ESA
- Multiple motions to dismiss filed and denied

Gov't Enforcement

- Nov. 2023: CWA settlement with Electron Hydro, LLC
- \$1.025 million civil penalty
- Installation of artificial turf released crumb rubber containing 6PPD to into Puyallup River harming protected fish species



CalEPA Approach to 6PPD- Quinone

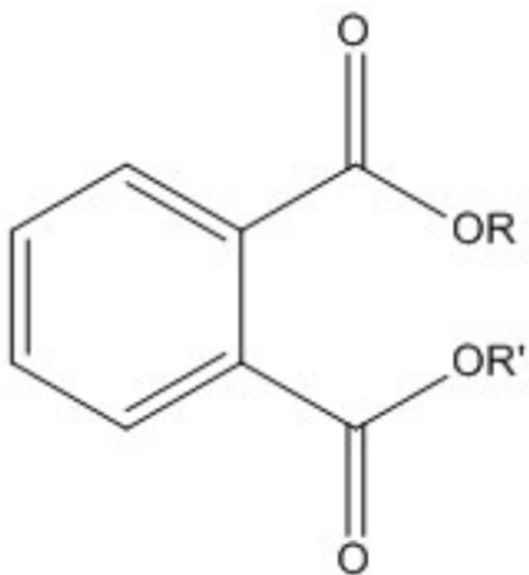
- Attending regular meetings led by USEPA
- Participating in the Interstate Technology and Regulatory Council (ITRC) tire contaminants group
- Coordination with CalRecycle
- Included 6PPD and 6PPD-Q in CEC pilot monitoring
- Water Board developing a map to identify areas of interest in California
- DTSC Safer Consumer Products Regulation

How Do We Address 6PPD-Q?



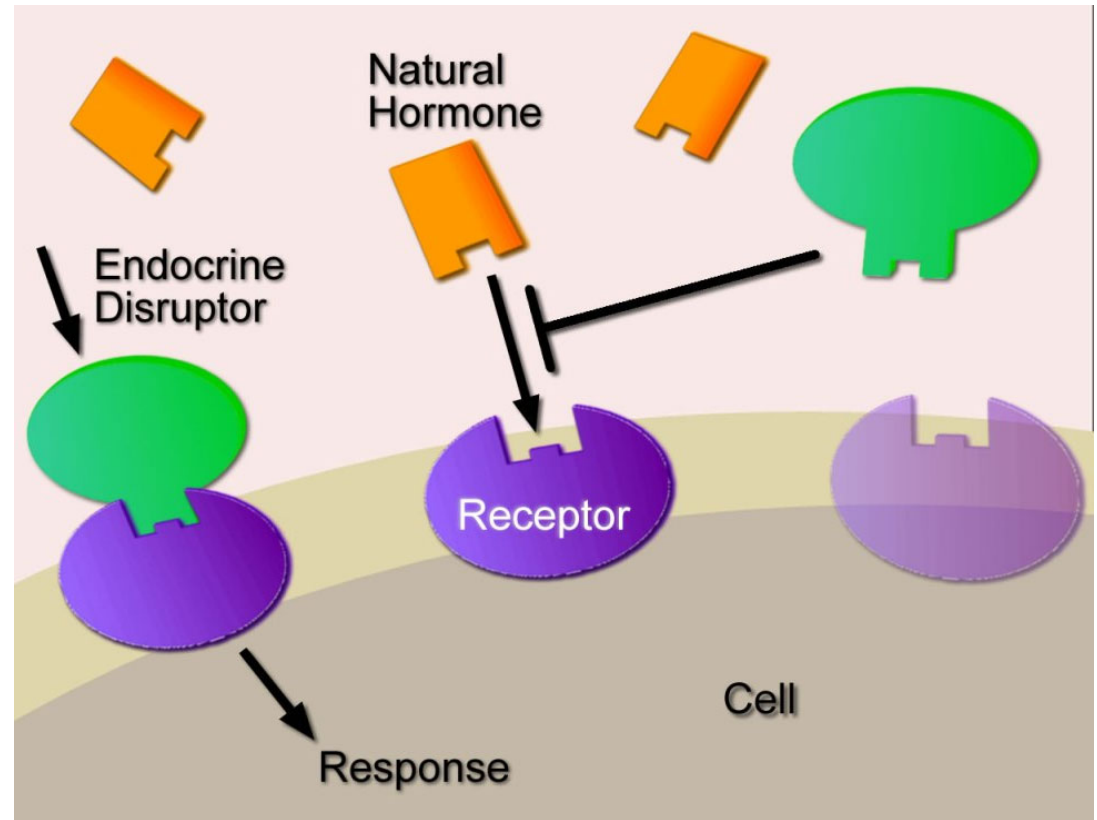
Phthalates

What are Phthalates?



What are Endocrine-Disrupting Chemicals (EDCs)?

- Mimic naturally occurring hormones in the body like estrogens and androgens
- Bind to a receptor within a cell and block the naturally-occurring hormone
- Interfere or block the way natural hormones are made



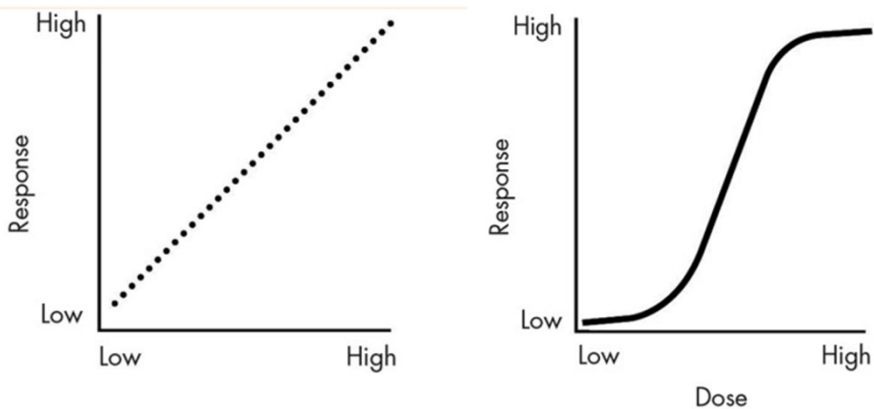
Emerging Contaminants – Endocrine Disrupters



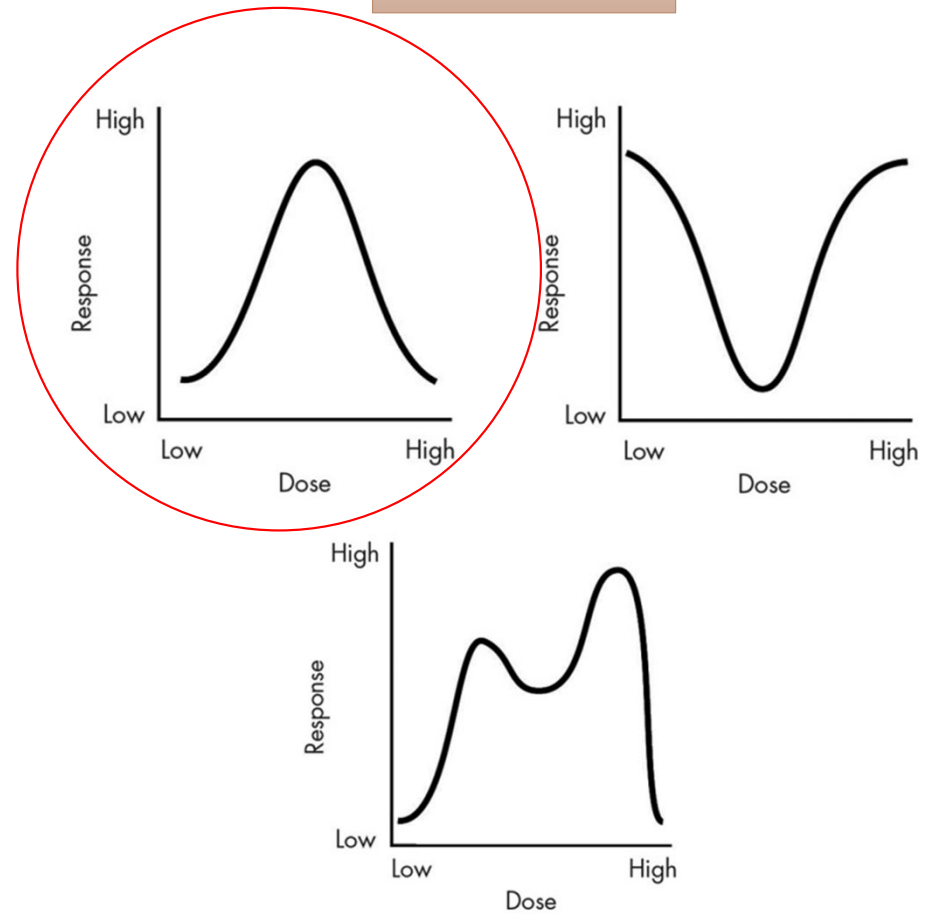
Robo Cop 2 (Orion Pictures/Amazon MGM Studios)

Dose-Response Relationships

Non-monotonic



Monotonic



Phthalates: Federal Regulations

- The FDA via the Fair Packaging and Labeling Act (FPLA)
 - Must list ingredients **except** for fragrance or flavor
 - May be listed as “fragrance” or “flavor”
- Modernization of Cosmetics Regulation Act of 2022 (MoCRA):
 - Improvements in labeling, recordkeeping, and manufacturing
 - Developing and implementing regs over next 2 years

“At the present time, the FDA does not have evidence that phthalates as used in cosmetics pose a safety risk.”

Phthalates: California Regulations

- CA Prop 65:
 - Must warn if exposed above certain levels of DBP, DEHP
- Cosmetic Fragrance and Flavor Ingredient Right to Know Act of 2020
 - Must report fragrance and flavor ingredients to CDPH – made public (as of 1/1/2022)
- CA Assembly Bill No. 2762
 - Prohibits the use DEHP and DBP as of **1/1/2025**
 - Consistent with European Union
 - Also includes parabens, 13 PFAS, mercury, formaldehyde, etc.



Phthalates Litigation Trends – Diffuse and Persistent

Criminal Enforcement

- *Fried Industries Inc.* (D. N.J. 1985): Manufacturer stored and disposed of phthalates without permit or notification to EPA. Pleaded guilty to two RCRA counts and a CERCLA failure to notify count – \$40,000 penalty

eNGO Lawsuit

- Health advocates represented by Earthjustice sued FDA in D.D.C. (Dec. 2024) to force reevaluation of decades-old authorizations for use of phthalates in food contact materials after FDA denied petition to revoke approvals

Products Liability

- Class action: *Stuve v. The Kraft Heinz Co.* (N.D. Ill. 2021): Mac & cheese deceptively labeled due to phthalates
- Multidistrict litigation: *Hair Relaxer* (N.D. Ill) (over 8,000 cases)

California: Prop 65

- Six phthalates on the Prop 65 list because they may cause birth defects or cancer
- Thousands of notices sent alleging failure to warn re: phthalates in pliable plastic (wallets, helmets, automotive products)

How Do We Address Phthalates?

Moss Landing fire: One of the world's largest battery factories ablaze

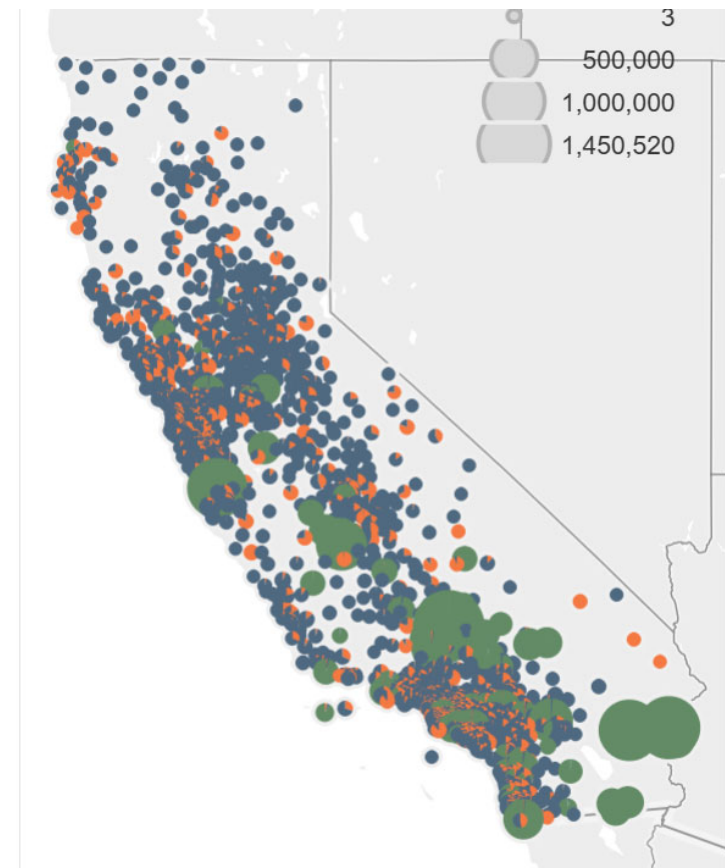


 **INDEPENDENT**

Lithium Ion Batteries

Lithium Ion Batteries

- Emerging hazard
- California has four of the ten largest battery energy storage facilities in the US
- California is only 25% along towards goal of battery storage increase by 2045
- Health risks from fires still being determined



Sources:

<https://energydigital.com/top10/top-10-us-battery-energy-storage-facilities>

<https://www.energy.ca.gov/data-reports/energy-almanac/california-electricity-data/california-energy-storage-system-survey>

Lithium Ion Batteries

- 35% of vehicles will be ZEV by 2026
- ALL new vehicles will be ZEV by 2035
- 99,000 plug-in hybrids and EVs sold in LA County in 2024



CAR AND DRIVER



Lithium Ion Batteries

Safety Report

NTSB/SR-20/01
PB2020-101011



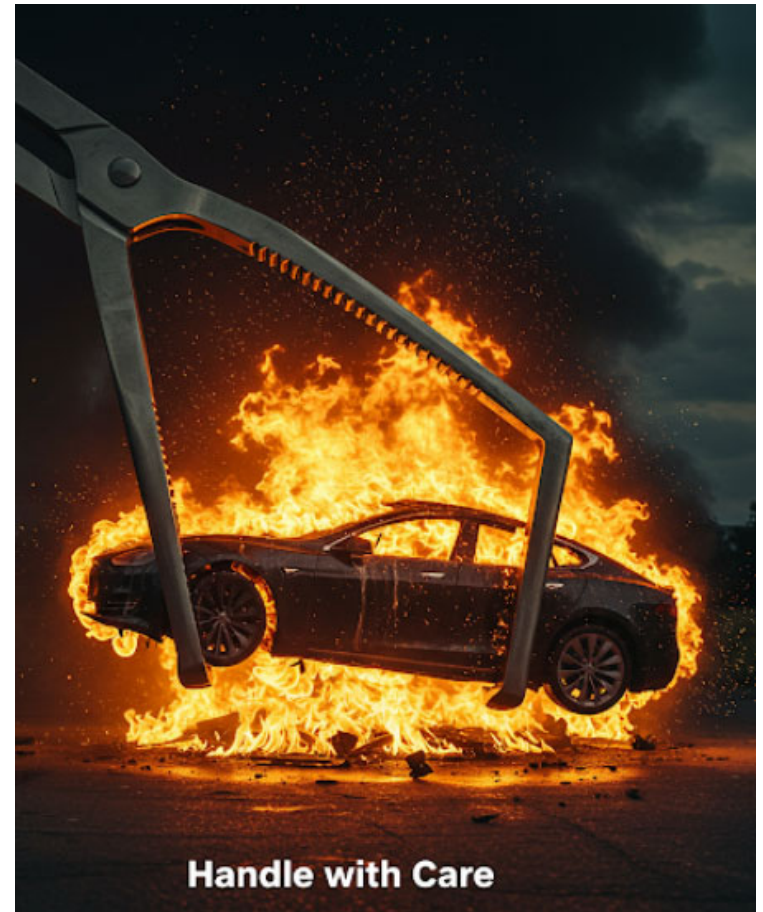
**National
Transportation
Safety Board**

**Safety Risks to Emergency Responders from Lithium-Ion
Battery Fires in Electric Vehicles**

- NTSB Safety Study.
- 50' clear radius when storing EV with damaged lithium ion battery.
- Stranded energy poses risk of electric shock.
- Multiple battery reignitions and fire.
- Water doesn't extinguish fires.

Lithium Ion Batteries

- Flame-resistant clothing.
- Mask covering face with filter cartridges or air tanks.
- Keep water on site.
- De-energize batteries.



Lithium Ion Batteries – Regulations

- 2007 – DTSC Lithium Ion Battery Disposal Fact Sheet
- 2022 - The Responsible Battery Recycling Act (AB 2440, Irwin) requires producers to establish a stewardship program for the collection and recycling of covered batteries.



Lithium Ion Batteries

• Moss Landing Litigation

- Multiple lawsuits filed in response to the impacts of the Jan. 16 fire
- State suits alleging strict liability for ultrahazardous activities for failure to properly store lithium-ion batteries; negligence; strict product liability; private nuisance; trespass; inverse condemnation
 - *Roeder v. Moss Landing Power Co.* (Alameda Sup. Court, Mar. 10, 2025)
 - *Jackson v. Vistra Corp.* (Alameda Sup. Court, Feb. 26, 2025)
- Federal suit alleging similar claims
 - *Vitale v. Vistra* (N.D. Cal. Mar. 12, 2025)
 - *Solano v. Vistra Corp.* (N.D. Cal. Feb. 27, 2025)
 - *Schmidt v. Moss Landing Power Company LLC* (Feb. 4, 2025) (removed from Alameda Sup. Court to N.D. Cal.)



How Do We Address Lithium Ion Battery Fires?

GENERAL PROCEDURES FOR HYBRID AND ELECTRIC VEHICLE FIRE SUPPRESSION

GENERAL

- Use standard vehicle firefighting equipment and tactics in accordance with department SOPs/SOGs.
- Hybrid and electric vehicles do not require special equipment for fire suppression/extinguishment.

PERSONAL PROTECTIVE EQUIPMENT

- All personnel should wear and utilize full PPE and SCBA as required at all vehicle fires.



Use Full PPE and SCBA

EXTINGUISHING AGENTS

- Use water or other standard agents for vehicle fires.
- The use of water does not present an electrical hazard to firefighting personnel.
- If an HV battery catches fire, it will require a large, sustained volume of water.



Safe to Use Water

WARNINGS

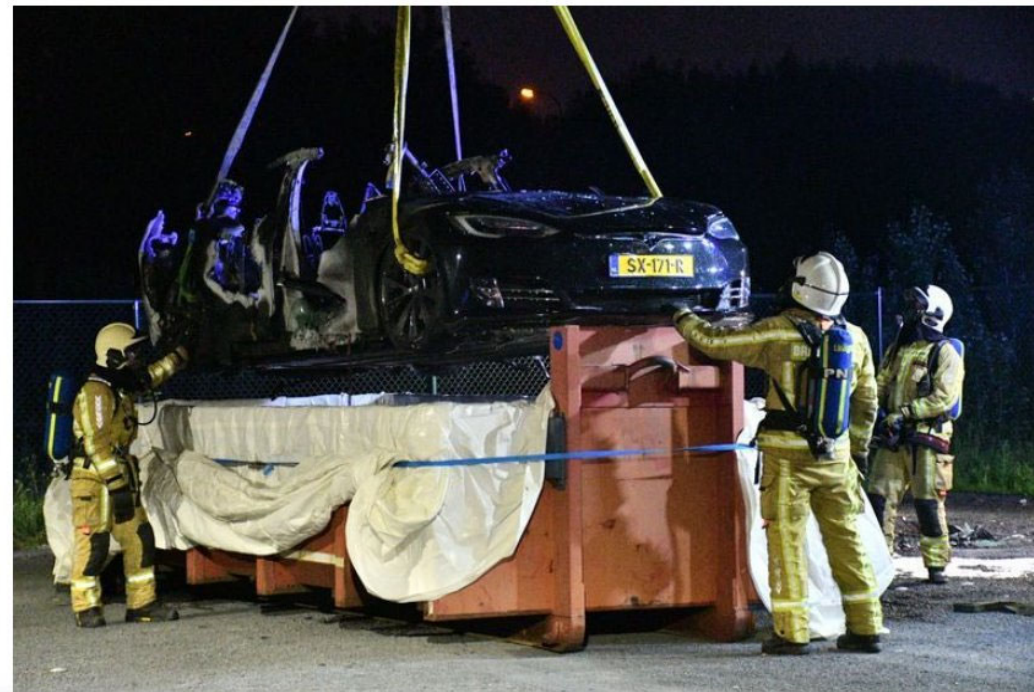
- If using water to extinguish/suppress a high voltage battery, use a large volume of water. Using only a small amount could allow dangerous toxic gases to be released.
- If a Lithium Ion (Li-Ion) HV battery is involved in a fire, there is a possibility that it could reignite after extinguishment. If available, use thermal imaging to monitor the battery. Do not store a vehicle containing a damaged or burned Li-Ion HV battery in or within 50 feet of a structure or other vehicle until the battery can be discharged.

NOTE:

Because high voltage batteries are in protective cases, it is very difficult to get any extinguishing agent directly onto the burning cells. The application of large volumes of water may cool the high voltage battery sufficiently to prevent the propagation of fire to adjacent cells.

FIRE

In Antwerp, Belgium, a Model S caught fire while charging. To douse the flames, firefighters had to drop the car in a tank of water and leave it submerged overnight.



PFAS

- 10's of thousands of chemicals
- Generally stable in the environment, now 2 are CERCLA Hazardous substances, now subject to TRI Reporting
- RWQCB's have sent >900 directives to investigate
- PFAS are primarily a water/groundwater issue, but are coming up in Phase I studies, but very few records exist as previously these were not "hazardous" in any way shape or form



L/W Correspondence file *(CERCLA)*
**BOOTS & COOTS
FIRE & PROTECTIVE EQUIPMENT, INC.**

1437 Leimert Blvd., Suite B
Oakland, California 94602-1860
(415) 482-5360

203 CE
24 Hour Emergency # (713) 999-0276 Houston, Texas

JUNE 3, 1988

3M COMPANY
3M CENTRE
ST PAUL, MN 55144
ATTN: MR. WILLIAM STEVENS

SUBJECT: FOAM SYSTEMS TESTING, BEALE A.F.B. CALIFORNIA.

IN ALL LITERATURE AND DOCUMENTATION THAT IS PUBLISHED BY THE
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THESE PRODUCTS ARE BIODEGRADABLE. FURTHERMORE, VERBAL PRESENTA

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In cases of Minor Cuts, Burns, Insect Bites, pat the Oil onto affected parts gently.

Bruises, Sprains, Athletes Foot, Sore Muscles, Aching Feet and Limbs, bathe affected parts in warm water, or dry hot towel. Apply the Oil, rubbing gently over the surface.

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 For sale by all Druggists.
 (Patented March 1885.) See other

Emerging Contaminants – What We Thought We Knew

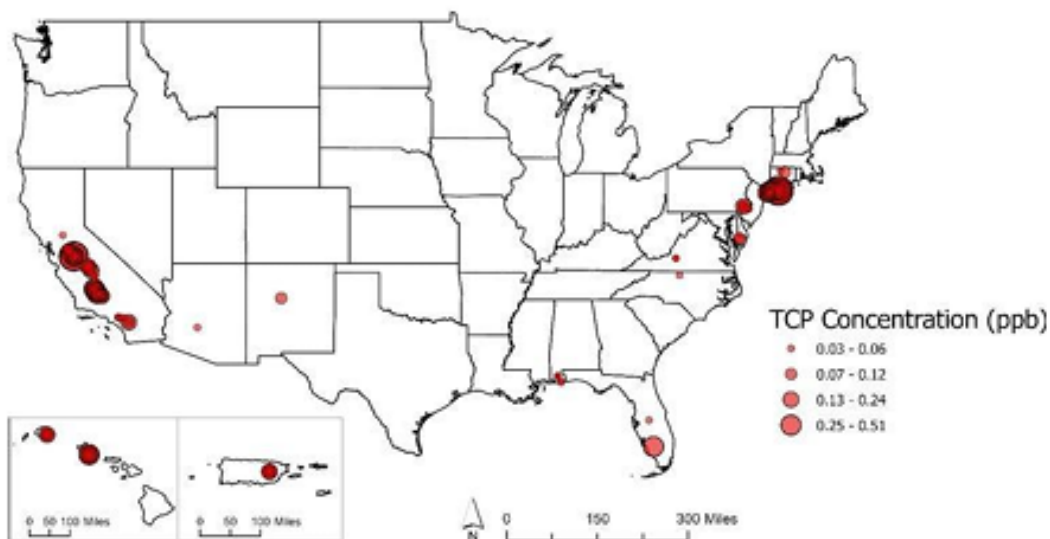


Figure 1: Map showing U.S. locations which have detected 1,2,3-Trichloropropane (TCP) levels in groundwater. Hawaii (left) and Puerto Rico (right) are in the inset. TCP concentration in parts per billion (ppb) or $\mu\text{g/L}$. Data from EPA, (UCMR, 2013-2015).

1,2,3-TCP Impacts in Groundwater

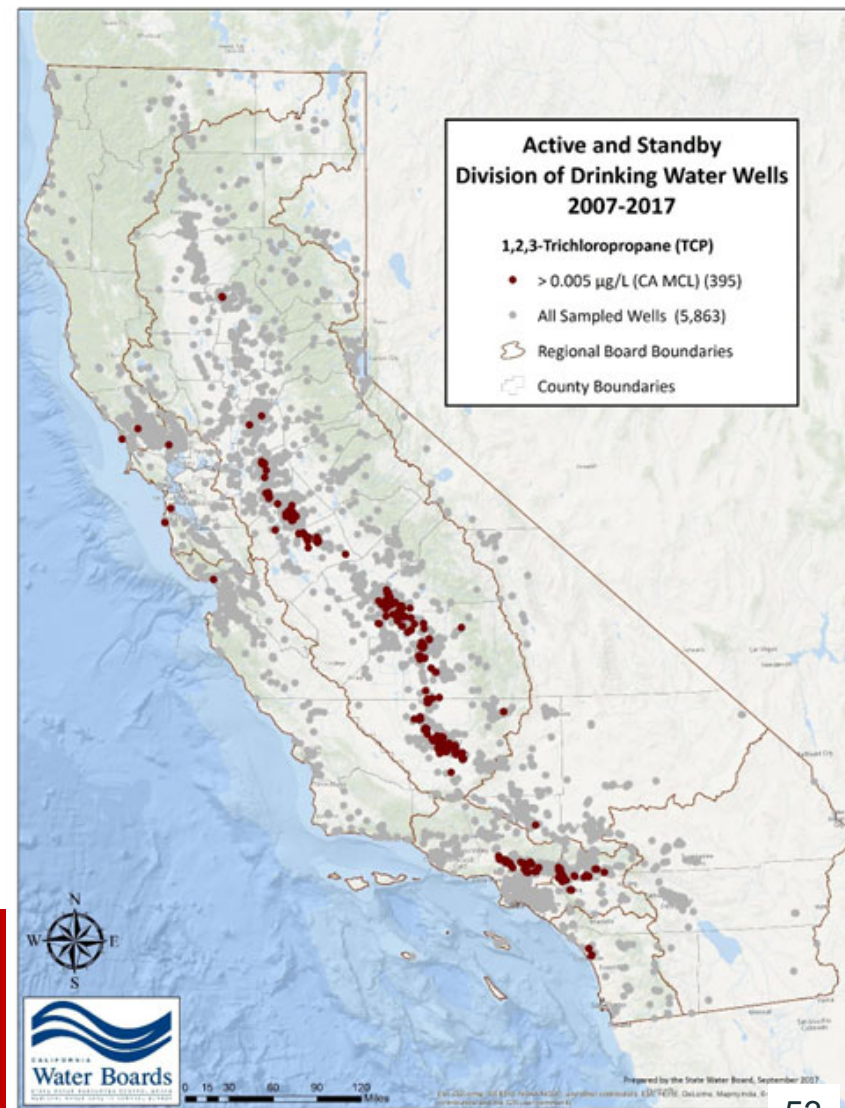


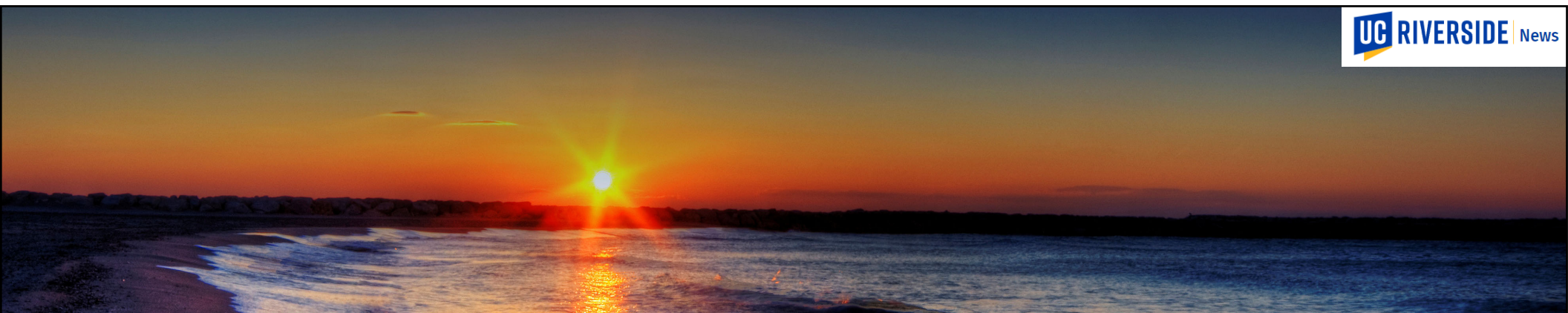
Figure 1. Active and standby public drinking water wells that had at least one detection above the California MCL, 2007-2017, 395 wells. (Source: Public supply well data in [GAMA GIS](#)).

Emerging PFAS Destruction Technologies

- Pilot phase:
 - Supercritical water oxidation
 - Plasma gasification
 - Pyrolysis and gasification coupled with a high-temperature thermal oxidizer
- 2024 Interim Guidance on the Destruction and Disposal of PFAS and Materials Containing PFAS
- Funding opportunities through the Clean Water State Revolving Fund Emerging Contaminants.



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‘Forever chemical’ discovery can aid drinking water cleanups