Microplastics: Law and Policy Landscape

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NATIONAL ACADEMY OF SCIENCES
EMERGING TECHNOLOGIES TO ADVANCE RESEARCH AND DECISIONS ON THE ENVIRONMENTAL HEALTH EFFECTS OF MICROPLASTICS
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- Attorney, Licensed in the US states of Oklahoma, Arkansas, South Carolina and the District of Columbia
- Fellow, American Institute of Chemical Engineers
- Fellow and President Elect, American College of Environmental Lawyers

- EPA CERCLA (Superfund) On-Scene Coordinator (Response and Remediation) (1985-1988);
- EPA RCRA Permit Writer for Hazardous Waste Incineration (1988-1989);
- Commercial hazardous waste incineration corporate compliance officer (CAA PSD, RCRA TSD and Subpart O, TSCA) (1989-1992);
- EPA Office of General Counsel, Summer Honors Program, Air and Radiation Division (1994);
- Since 1995, Industry Environmental Defense Counsel in regulatory permitting, compliance and enforcement, litigation and transactions, especially related to air, hazardous and solid waste permitting and regulation, response/remediation, resource conservation and recovery testing limits of “solid waste,” “hazardous waste,” and “legitimate recycling.”
Constitution

**Article I – Legislative Branch** – to draft and fund Federal Legislation

**Article II – Executive Branch** – President and Federal Agencies, to implement Legislation

**Article III – Judicial Branch** - Federal Courts, created with limited jurisdiction

- Federal Courts review questions of federal law including Federal Agency decisions, pursuant to the U.S. APA, as well as review whether laws are constitutional
Statutes must have a rational basis: they must be rationally related to a legitimate governmental interest.

E.g., Protecting the public health with an adequate margin of safety.
Article II – Regulations

Example: CAA Prevention of Significant Deterioration Regulations

- Approval and Promulgation of Implementation Plans
- Classification of Regions
- Legal Authority
- Review of New Sources and Modifications

Regulations, adopted to implement law:

- Cannot be “arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law” and

- Enforcement must be supported by “substantial evidence.”
Article III - Judicial Decisions

Example:
United States Supreme Court (2007) - Reviewing EPA's Decision to Not Regulate Greenhouse Gases under the Clean Air Act

Expert Witness Opinion Testimony (Daubert) Evidentiary Standard requires consideration of:

(1) whether the theory or technique can be or has been tested;
(2) whether subjected to peer review and publication;
(3) the known or potential rate of error;
(4) general acceptance in the scientific community.

MASSACHUSETTS ET AL. v. ENVIRONMENTAL PROTECTION AGENCY ET AL.

CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE DISTRICT OF COLUMBIA CIRCUIT

No. 05–1120. Argued November 29, 2006—Decided April 2, 2007

Based on respected scientific opinion that a well-documented rise in global temperatures and attendant climatological and environmental changes have resulted from a significant increase in the atmospheric concentration of "greenhouse gases," a group of private organizations petitioned the Environmental Protection Agency (EPA) to begin regulating the emissions of four such gases, including carbon dioxide, under §202(a)(1) of the Clean Air Act, which requires that the EPA "shall by regulation prescribe . . . standards applicable to the emission of any air pollutant from any class . . . of new motor vehicles . . . which in [the EPA Administrator's] judgment cause[s], or contribute[s] to, air pollution . . . reasonably . . . anticipated to endanger public health or welfare." 42 U. S. C. §7521(a)(1). The Act defines "air pollutant" to include "any air pollution agent . . . , including any physical, chemical . . . substance . . . emitted into . . . the ambient air." §7602(g). EPA ultimately denied the petition, reasoning that (1) the Act does not authorize it to issue mandatory regulations to address global climate change, and (2) even if it had the authority to set greenhouse gas emission standards, it would have been unwise to do so at that time because a causal link between greenhouse gases and the increase in global surface air temperatures was not un-
United States Legal System – Mirrored at the State Level

**Constitution, Article I - Legislative – Congress**
- Enacts Statutes; Appropriates Funds; Delegates Authority to Agencies

**Constitution, Article II - Executive – The President, Cabinet, Federal Agencies**
- White House signs Statutes forwarded by Congress into Law
- Issues Executive Orders
- Appoints Judges and Agency Administrators
- Agencies promulgate Regulation as required by Statute
- Agencies operate with Congressional Oversight and Judicial Review, governed by their enabling legislation, specific statutes delegating authority, the Administrative Procedures Act

**Constitution, Article III - Judicial – Courts**
- Resolve legal claims by reviewing allegations within their jurisdiction, issuing findings of fact and conclusions of law to provide a remedy
- Review errors of law upon appeal of lower court decisions.
Where are we regarding plastic?

- The United States is recycling plastics at insignificant rates (5-8%);
- The Basel Convention on the Control of Transboundary Movement of Hazardous Wastes and their Disposal (1989) was modified in May 2019 to list plastic waste;
- As a result, transboundary shipments of plastic waste have stalled.
- Macro and micro plastic have become recognized as critical issues.
The Safe Drinking Water Act regulates public water supply, imposing Maximum Contaminant Limits (MCLs) for chemical contaminants including:

- Microorganisms and viruses; **Turbidity (cloudiness, suspended solids)** up to **0.3 ntu**; Disinfectants; Disinfection Byproducts; Inorganic Chemicals; Organic Chemicals (not plastic); Radionuclides.

- Also, Monitoring for unregulated contaminants (including PFOA, PFOS) Consumer confidence reports and public, notifications.

**Microplastics are not included unless captured as Turbidity – allowed up to 0.3 Nephelometric Turbidity Units.**

The Solid Waste Disposal Act regulates:

- **Disposal of nonhazardous** solid waste (liquid, solid, containerized gas) implemented by state agencies.

- **Management of hazardous** solid waste Strictly Regulated from “cradle to grave”:
  - Listed hazardous waste;
  - Characteristic hazardous waste – ignitable, reactive, flammable, toxic.

- **Nonhazardous solid waste** “litter” – and thus plastic waste “leakage” - becomes a municipal enforcement issue.

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The Clean Water Act regulates:

- Point source and indirect pollutant discharges to Waters of the United States to meet water quality, technology and environmental toxicity standards:

- “Pollutants” defined broadly and include:
  - Conventional pollutants including biochemical oxygen demand (BOD), total suspended solids (TSS), fecal coliform, pH and oil and grease;
  - Toxic pollutants including 65 pollutants and classes, with 126 specific substances designated as priority pollutants;
  - Nonconventional pollutants

- Plastic may not be included in NPDES permits unless TSS, and even if it was, may be limited to acceptable discharges of visible plastic.
June 2019 Petition to update CWA Regulations, 40 CFR Parts 414 and 419:

1. Prohibit the discharge of plastic pellets and other plastic materials in industrial stormwater and wastewater;

2. Update Effluent Limitations Guidelines and Standards for new facilities to eliminate the discharge of toxic priority pollutants from wastewater and stormwater streams;

3. For existing facilities, put into effect Effluent Limitations Guidelines and Standards for pollutants of concern not currently regulated; and

4. Update current Effluent Limitations Guidelines and Standards for existing facilities to reflect advances in detection and treatment technologies since the last revisions decades ago.

BEFORE THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

280 ENVIRONMENTAL, PUBLIC HEALTH, INDIGENOUS, AND COMMUNITY NON-GOVERNMENTAL ORGANIZATIONS,* (full list on pages i-iii)

Petitioners,

vs.

ANDREW WHEELER, ADMINISTRATOR, UNITED STATES ENVIRONMENTAL PROTECTION AGENCY,

Respondent.

PETITION TO REVISE THE CLEAN WATER ACT EFFLUENT LIMITATIONS GUIDELINES AND STANDARDS FOR THE PETRO-PLASTICS INDUSTRY UNDER THE 40 C.F.R. PART 419 PETROLEUM REFINING INDUSTRIAL CATEGORY (CRACKING AND PETROCHEMICALS SUBPARTS) AND PART 414 ORGANIC CHEMICALS, PLASTICS, AND SYNTHETIC FIBERS INDUSTRIAL CATEGORY
Also on June 26, 2019

"Formosa’s 2016 Permit prohibits the “discharge of floating solids or visible foam in other than trace amounts” ... Moreover, TCEQ rules prohibit the discharge of “floating debris and suspended solids” into surface waters.

"The undisputed evidence shows that plastic pellets and PVC powder discharged by Formosa caused or contributed to the damages suffered by the recreational, aesthetic, and economic value of [surface water]. Hence, the presence of PVC powder and plastic pellets distressed the area and lessoned the enjoyment of the local environment."

CERCLA provides authority to compel responsible parties to respond to, and remEDIATE, releases of “hazardous substances” from facilities and vessels, and addresses “pollutants or contaminants” posing “imminent and substantial endangerment.”

- Responsible parties are defined to include: Owners and Operators of vessels or facilities; Transporters; Arrangers for Disposal.

- “Release” is defined to include “Leaching,” a potential basis for CERCLA action.
In 2012, CBD filed a Petition Pursuant to CERCLA, 42 U.S.C. § 9605(d):

Any person who is, or may be, affected by a release or threatened release of a hazardous substance of pollutant or contaminate, may petition the President to conduct a preliminary assessment of the hazards to public health and the environment which are associated with such release or threatened release.

In 2014, EPA issued its CERCLA Preliminary Assessment:

Initial studies conducted by EPA in areas outside of the NWHI indicate that microplastic marine debris can accumulate and transport contaminants in the marine environment into the food chain.

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December 11, 2012


The reefs and shores of the Northwest Hawaiian Islands are littered with hundreds of thousands of pounds of plastic garbage. Derelict fishing gear and debris entangles innumerable fish, sea birds, and marine mammals, often resulting in injury and death. Plastic pollution harms wildlife via entanglement, ingestion, and toxic contamination, causes substantial economic impacts, and is a principal threat to the quality of the environment.
U.S. Clean Air Act, 42 U.S.C. § 7401, et seq.

The Clean Air Act regulates ambient air quality by limiting sources of air pollutants from:

- **Stationary sources** of criteria pollutants to meet air quality and technology standards, as well as hazardous air pollutants:
  - Criteria pollutants include nitrogen and sulfur dioxides, carbon monoxide, lead, ozone as volatile organic compounds, and **particulate less than 2.5 micrometers**;
  - Hazardous air pollutants – 187 chemicals listed for carcinogenicity, toxicity and other potential harms.

- **Mobile sources** of criteria air pollutants from internal combustion engines.

**Microplastics air emissions from ground level sources** are generally not covered – leaving no path to directly limit these microplastic emissions to ambient air.

In any case, plastic component of PM2.5 appears to be difficult to completely capture and analyze due to limitations in sampling and analytical methods.

*Not Legal Advice - For Educational Purposes Only*
The Clean Air Act and Microplastics

Air: There are no data available for microplastics in air in the US. The only studies worldwide have been carried out in France and Iran, and reported that microplastics were present in indoor and outdoor dust samples and atmospheric fallout (Dris et al. 2015; 2016; 2017; Dehghani et al. 2017).

EPA Microplastics Expert Workshop Report, Trash Free waters dialogue Meeting (June 2019)
Ambient Air and Stack Sampling Limitations:

- No EPA air sampling method specifically designed for plastic particulate, which may have unique aerodynamic and other properties;
- EPA particulate sampling method is limited by technology;
- Scanning Electron Microscopy practical automatic detection limit is 0.1 µm;
- Other than visual speciation, analysis of particulate is generally through analytical methods such as extraction, may not amenable to speciating plastic component of particulate sample.

Guideline on Speciated Particulate Monitoring, EPA OAQPS (August 1998)

40 CFR 723.250(b) – “Polymer”

40 CFR 723.250(d) - exempts from Premanufacture Notice requirements those polymers that are inert:

- Based on level of concern regarding functional groups
- And not excluded from the exemption.

Still covering polymers that are cationic, degradable or unstable, water-absorbing or vulnerable to reactants.

More inert = less regulated.

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REACH - Registration, Evaluation, Authorization, and restriction of Chemical substances

- Chemicals regulation
  - Applicable to plastics as well as articles imported into the EU
  - Requires:
    - Registration
    - Collection or generation of data on the substances
    - Focuses on chemical toxicity including “Substances of Very High Concern (SVHCs)"

- ECHA Guidance on Registration (2016), Section 2.2.3.7 Polymers: **Owing to the especially extensive number of different polymer substances on the market, and since polymer molecules are generally regarded as representing a low concern in relation to their high molecular weight, this group of substances is exempted from registration.**
Common Law

Legal Claims Require Proof of “Injury” to meet “Standing” requirements

► Plaintiffs must have “standing”

► injury in fact, which means an invasion of a legally protected interest that is concrete and particularized, and actual or imminent, not conjectural or hypothetical;

► a causal relationship between the injury and the challenged conduct, i.e., the injury can be fairly traced to the challenged action of the defendant, and has not resulted from the independent action of some third party not before the court; and

► a likelihood that the injury will be redressed by a favorable decision, which means that the prospect of obtaining relief from the injury as a result of a favorable ruling is not too speculative.

► Claims Must be ripe and not moot

► Necessary and Indispensable Parties

► Burden of Proof – For Civil Claims, Preponderance of the Evidence
Gaps in Existing Authority

GAP: Our Environmental Programs define Harm overwhelmingly as “chemical toxicity” - not biological interference from the physical presence of persistent, generally inert material, nor the implications arising with the peculiar adsorption properties of plastic.

- Develop methods and metrics for defining and assessing potential for physical harm by inert material at the macro and micro level as discussed here, considering surface chemistry. Consider approach analogous to Nanotechnology review.

GAP: Our Environmental Sampling and Analytical Methods do not include methods for developing evidence and metrics of physical harm. Environmental Sampling and Analytical methods overwhelmingly designed to capture and represent concentrations of chemical constituents.

- Develop qualitative and quantitative methods to assess all relevant categories (including size, type, shape, surface chemistry, contaminants) of inert material in our biological and environmental systems.
Gaps in Existing Authority

GAP: Product Stewardship authority could be reviewed to evaluate opportunities for better integrating material development, commercialization, manufacturing and distribution in managing potential harm from perpetual inert materials in our environment:

- Develop additional criteria for assessing prospective risk from new materials considering perpetual presence in the environment; consider defining resistance to degradation as multipliers of natural material degradation

GAP: Integration of all stakeholder including academic, government, industry, commercial and consumers to develop mitigation approaches.

- Continue and further develop efforts like this to develop:
  - Shared methodologies and research to develop consistency in approaches and enhance efficiency;
  - Reach agreement among government, manufacturers, distributors as well as secondary manufacturers, e.g., washing machine and dryer ancillary filter equipment to capture fabric fibers;
  - Educate consumers.
Thank you!

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