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Whose PFAS Is it Anyway? Legal Defensibility of Nonstandard Environmental Analysis

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As regulatory and public scrutiny over per- and polyfluoroalkyl substances (PFAS) in the environment remain in the spotlight, a growing field of scientists are working to answer an important question: whose PFAS is it? The widespread historical presence of PFAS in household products and industrial applications, parts-per-trillion regulatory limits in drinking water, and the risk of liability that may result from evolving state and federal hazardous substance listings, are fueling an ever-growing field of environmental forensics specifically for this class of chemical. To determine responsible parties and help quantify discharge contributions, scientists apply a multiple lines of evidence approach. Sample data combined with historical operational information, including but not limited to release pathways and formulation chemistries, can aid in identifying one or more sources.

Scientific Perspective of a Recent PFAS Investigation

PFAS are a class of thousands of fluorinated chemicals used in a range of applications, from firefighting foams to medical devices. As of April 2021, 32 are measurable in environmental samples with validated U.S. Environmental Protection Agency (EPA) methods, (1) and a smaller subset are regulated in drinking water, groundwater, and soil, depending on the U.S. state. Recently, scientists and regulators have employed nonstandard environmental analyses for PFAS in attempts to find unique "marker" chemicals that further pinpoint responsible parties. For example, a June 2020 study in New Jersey used analytical techniques that were not based on standard EPA methods to detect a unique class of PFAS compounds in soil, which the authors linked to emissions from a nearby specialty chemicals site. (2) Notably, the authors of this study did not have an

authentic reference standard for the PFAS compounds in question. The study authors did acknowledge limitations and information gaps including the compounds' unknown mobility and degradation in the environment and potential toxicity. Despite this, the study was later referenced in a complaint filed by the state of New Jersey against the specialty chemicals company the authors identified. [3]

Analytical methods that search for and detect chemicals, without using specific reference standards for each analyte, are collectively known as non-targeted analyses (NTA). These methods are commonly employed for research purposes, when the investigator aims to identify unique features in the sample rather than focusing on a handful of analytes. This approach differs from a targeted analysis, where the instrumentation is programmed to search for a specific compound and is calibrated with an authentic reference standard of that same compound.

With NTA, scientists generally do not know *a priori* which chemicals will be detected, or if they will have sufficient information to verify and quantify the specific chemicals they may detect. However, the NTA approach has utility for providing some chemical information for screening purposes. For example, the thousands of PFAS compounds known or suspected to be historically used and manufactured have led to NTA method development, and in at least one case was required for monitoring waste from a suspected discharger. [4] Generally, conclusions based on the weight of evidence from environmental analytical data follows a hierarchy grounded in analytical rigor, method acceptance within the community, and extent of the method application amongst practitioners. When source attribution is based on nonstandard environmental analyses, one must ask whether these methods, particularly for PFAS compounds, offer the same reliability as validated targeted chemical analyses typically conducted for regulatory purposes.

Legal Considerations for PFAS Identification

Criteria similar to the standards of analytical rigor and certainty are assessed for evidence admissibility in courts. [5] When the state of the science is evolving, as with PFAS in the environment, careful attention to analytical methods is warranted. For example, the scientific community often encounters new environmental analytical methods developed in research labs well before the method is subjected to interlaboratory comparisons for full-scale validation as a standardized method. Could these methods and unconfirmed detections of PFAS compounds hold up in court?

New Jersey's suit illustrates that the use of an NTA method to detect a previously unidentified PFAS compound and attribute it to a particular source does not preclude a lawsuit from being filed. Once initial pleadings are filed, the litigation moves into the next phase: discovery. During the discovery phase, all parties strive to obtain more information about the case through means such as depositions, written discovery requests, and requests to produce documents. In complex litigation, this phase can take several years to complete before the parties are ready for trial.

In the case of the New Jersey suit, if the plaintiffs are unable to directly verify the specific PFAS compound(s) in question, they are likely to rely on expert testimony supporting the June 2020 study linking the unverified compound to the responsible parties in court. The defendants may move to preclude this expert opinion under *Accutane*, [6] New Jersey's version of the *Daubert* standard, at various stages of the case, including motions, hearings, and trial. *Accutane* controls the admissibility of scientific expert testimony in New Jersey state courts and affirmatively assigns the presiding judge to the role of "gate keeper." As gate keeper, the judge is tasked with preventing unreliable science from being presented to the jury by weighing the four *Accutane* factors against the expert opinion being challenged: (1) testability of the theory; (2) peer review and publication; (3) known or potential error rate; and (4) general acceptance in the scientific community. [7]

Regarding the first *Accutane* factor, testability of theory, the NTA method used in the June 2020 study to detect PFAS in the soil in New Jersey could be replicated by another scientist reproducing the same soil study and potentially reaching similar conclusions regarding likely responsible parties. Regarding the second factor, the scientific theory was published in the reputable and peer-reviewed journal *Science*. In contrast, the third *Accutane* factor assesses the known or potential error rate; but unlike targeted chemical analysis calibrated with an authentic standard, scientists cannot be completely certain of chemicals detected using NTA methods. This third *Accutane* factor may pose the greatest challenge to admissibility in court. The fourth factor presents an interesting analysis as the NTA method is a generally accepted method for research, but it is not yet commonly accepted in the scientific community as a means of definitively assigning the chemical structure and verifying the presence of a compound.

In weighing these factors, the presiding judge does not have to give equal weight to every factor, and the judge may find evidence admissible even if one or more factors weigh in favor of inadmissibility. For example, even if the judge found that the plaintiffs were unable to use a targeted analysis method because of a lack of an authentic reference standard (factor three), the judge could find the evidence admissible under *Accutane*. If this were to occur, it would likely open the door to more claims in PFAS litigation, as NTA methods could potentially be used to identify

responsible parties using analytical information describing the thousands of existing PFAS compounds that do not yet have authentic reference standards. Whether the presiding judge rules that the methods used in the June 2020 article [8] are admissible or inadmissible, the ruling will likely be appealed due to the significant precedent this case will set for the future of PFAS litigation.

Endnotes

1. *See* USEPA Methods 537.1, 533, and 8327.
2. J.W. Washington et al., Nontargeted mass-spectral detection of chloroperfluoropolyether carboxylates in New Jersey soils, 368 Science 1103–07 (2020).
3. *New Jersey Department of Environmental Protection et al. v. Solvay Specialty Polymers USA, LLC, et al.,* No. GLO L-001239-20 (N.J. Super. Ct. 2020).
4. *North Carolina v. The Chemours Company FC, LLC,* No. 17 CVS 580 (N.C. Sup. Ct. 2019) Consent Order at ¶ 11(a).
5. *Daubert v. Merrell Dow Pharmaceuticals, Inc.,* 509 U.S. 579, 113 S. Ct. 2786 (1993).
6. *In re: Accutane Litigation,* 234 N.J. 340 (2018).
7. *In re: Accutane Litigation,* 234 N.J. 340, 398 (2018).
8. Washington et al., Nontargeted mass-spectral detection of chloroperfluoropolyether carboxylates in New Jersey soils, at 1103–07.

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