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Michigan's Sleeping Bear Dunes are great for hiking and sledding in the winter

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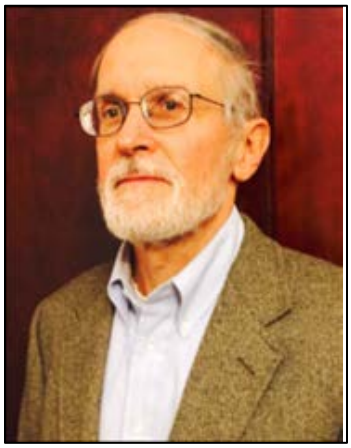
Welcome Scott Steiner as the New Chair of the Environmental Law Section

As you read this 103rd issue of the MELJ, you will notice something different. It is the first issue of the last 20 which is not produced by Chris Dunsky, our long time editor and chair of the Journal Committee. Chris has always done a stellar job with the *Journal* and we are most grateful for his years of dedication and insistence on a high quality publication. The good news is that we have Amanda Urban who is taking over the editor position with a lot of energy, great ideas, and determination to continue at the high level Chris maintained.

By the same token, as I begin my term as chair of the Section, I hope to continue the high level of service and accomplishment set by my predecessor, Dennis Donohue and those before him. One major area of focus will be our efforts to increase the membership and active involvement of young attorneys and law students interested in environmental law. As always, we will have several webinars and other programs, including joint conferences with other professional organizations, covering current issues. Be sure to check out the Section page at SBM Connect for all the latest information and publications.



Chris Dunsky Passes the Torch as Editor of the Michigan Environmental Law Journal

During Chris Dunsky's time as chair of the Journal Committee, the environmental legal landscape underwent many important developments and Chris was certain to capture them all. Under Chris's editorship, the *Journal* included pieces on *Burlington Northern*, the Asian Carp Invasion, Water Affordability in Detroit, and key updates to Michigan's Public Acts. Chris also authored numerous pieces in the *Journal* over the years including a fascinating article on wild hogs as a prohibited species in Michigan.

After serving as the editor of the *Journal* for more than five years, Chris has relinquished his title and the Council has selected Amanda Urban as his successor. Amanda brings to the *Journal* her experience as an editor of the *Michigan Environmental and Administrative Law Journal* during her time as a student at the University of Michigan Law School. Following graduation she worked as a legal fellow at the International Institute of Law and the Environment in Madrid, Spain. Currently, she serves as a law clerk in the Eastern District of Michigan, but she looks forward to practicing in environmental, natural resources, and energy law upon completion of her clerkship. In the meantime, she hopes to build upon Chris's work and continue the *Journal's* tradition for excellence. If you have an idea for a piece for the *Journal* or would like to write an article, please contact her at her personal email: ajurban@umich.edu.

Key to Causation: The Use of Expert Witnesses in Toxic Tort Cases

John Pirich
Partner, Honigman Miller Schwartz and Cohn LLP

On July 25, 2017, the Michigan Supreme Court overturned the Court of Appeals and reinstated the Calhoun Circuit Court's order granting the defendant's motion for summary judgment in *Lowery v. Enbridge Energy, L.P.*[1] It was not the order itself but, rather, Chief Justice Markman's concurrence that holds particular significance. Chief Justice Markman's concurrence, which was joined by Justices Zahra and Wilder, indicates that, in toxic tort cases, "a plaintiff will often be hard-pressed to satisfy that evidentiary burden absent expert testimony"[2] and provides explicit guidance on the largely unsettled area of expert testimony in Michigan toxic tort law.

An Oil Spill and an Avulsion Lead to a lot of Legal Questions

Energy Limited Partnership and Enbridge Energy Partners, LP, (Enbridge) spilled 840,000 gallons of crude oil, which made its way into nearby waterways and spread almost 40 miles throughout the counties of Calhoun and Kalamazoo.[3] The plaintiff, Chance Lowery, lived near the origin of the spill and the waterways through which the oil disseminated.[4] Lowery alleged that, after inhaling the chemicals from the spill, he experienced coughing and vomiting, which led to hospitalization and, ultimately, a stomach hemorrhage.[5] Lowery then filed a complaint alleging that Enbridge's negligence, in exposing him to a toxic substance, served as the proximate cause of his injuries.[6]

Although Lowery presented testimony from a general physician and a treating physician, neither one could reasonably link Lowery's symptoms to the oil spill.[7] The trial court determined that there was no clear link between the stomach hemorrhage and the oil spill and granted the defendant's motion for summary judgment on that issue, but permitted Lowery to argue that his migraines and vomiting had been caused by the spill. Lowery's counsel then requested that the court grant summary disposition in its entirety, because the entire case was about the surgery to

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[1] *Lowery v Enbridge Energy L.P.*, 500 Mich 1034; 898 NW2d 906 (2017).

[2] *Id.* at 918 (Markman, C. J., concurring).

[3] *Id.* at 908.

[4] *Id.*

[5] *Id.*

[6] *Id.*

[7] *Id.* at 908-909.

repair the stomach hemorrhage, and his counsel wished to appeal the case immediately.[8] The trial court concurred and granted summary disposition in its entirety.[9] Lowery then appealed.

The Court of Appeals reversed the grant of summary disposition. It held that no expert testimony was required to show that the toxin from the oil spill was capable of causing and did actually cause Lowery's injuries.[10] In fact, the Court of Appeals determined that the circumstantial evidence Lowery presented was sufficient for a reasonable jury to conclude that the fumes from the oil spill caused his vomiting and, ultimately, his stomach hemorrhage.[11]

"many jurisdictions take a bifurcated approach by dividing causation into an analysis of general causation and specific causation"

Enbridge then filed an Application for Leave to Appeal with the Michigan Supreme Court. The Court granted leave to appeal to consider: "(1) whether the plaintiff in this toxic tort case sufficiently established causation to avoid summary disposition under MCR 2.116(C)(10); and (2) whether the plaintiff was required to present expert witness testimony regarding general and specific causation."[12] The Michigan Supreme Court heard the appeal and concluded that Lowery's evidence reflected "*post hoc* reasoning," rather than a "logical sequence of cause and effect."[13] This holding was further illuminated by Chief Justice Markman's concurrence, indicating that the "plaintiff failed to present adequate evidence of cause in fact, specifically evidence establishing *either* general or specific causation."[14]

But For is Bifurcated

In his concurrence, Chief Justice Markman explains the standard for causation in typical negligence tort cases and the special considerations for toxic tort claims. In order to prove that Enbridge's breach of duty[15] was the cause of his injuries, Lowery must show that "but for" Enbridge's negligence, he would not have suffered his injuries.[16] Because Lowery was making a toxic tort claim, he needed to demonstrate "an injury arising from exposure to a toxic substance."[17] Since toxic tort claims require this specialized showing of causation, many jurisdictions take a

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[8] *Id*. at 909.

[9] *Id.*

[10] *Id.*

[11] *Id.*

[12] *Id.* at 910 (quoting *Lowery v Enbridge Energy Ltd Partnership*, 499 Mich 886 (2016)).

[13] *Id*. at 907.

[14] *Id.* (MARKMAN, C.J., concurring) (emphasis in original).

[15] The trial court granted summary disposition on this issue. *Id.* at 908, n. 3.

[16] *Id.* at 924.

[17] *Id.* at 910.

bifurcated approach by dividing causation into an analysis of general causation and specific causation.[18]

General causation relates to whether a toxin can cause the alleged harm.[19] The presence of a toxin alone would have been insufficient to show general causation. Lowery needed to demonstrate that he was exposed to the toxin and that the exposure level was high enough to cause his symptoms.[20] Evidence of the exposure level of a toxin required to cause harm is essential, because some substances are only harmful at higher levels.[21] As such, when addressing general causation, Lowery needed to tailor his evidence to the "*estimated* amount and duration of exposure at issue" to allow the fact-finder to reasonably conclude that both the amount of the toxin and the duration of exposure to the toxin is capable of causing the alleged injury.[22]

In contrast, specific causation "consists of proof that exposure to the toxin more likely than not caused *the plaintiff's* injuries."[23] In addition to providing evidence of the plaintiff's exposure levels, the plaintiff must also eliminate other "reasonable potential causes."[24] This evidence of exposure need not be mathematically precise; it can be established through reliable circumstantial evidence.[25] If used, this circumstantial evidence must enable the fact-finder to make reasonable inferences to effectively demonstrate causation.[26] The other crucial component in this framework is the "need by some reasonable means to evaluate and eliminate other reasonably relevant potential causes of the plaintiff's injury."[27] That is to say the plaintiff must be able to identify the most probable of these potential causes in order to meet the specific causation burden.[28]

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[18] *Id.* at 911.

[19] *Id.* at 913.

[20] *Id.* at 914.

[21] *Id.*

[22] *Id.*

[23] *Id.* (emphasis in original).

[24] *Id.* at 919.

[25] *Id.* at 915.

[26] *Id.*

[27] *Id.* at 916-917.

[28] *Id.* at 917.

Let the Experts Handle it

Lowery's supposed expert,[29] a general physician who is board certified in family medicine,[30] was ill-equipped to testify to the relevant factors in showing causation.[31] Although Plaintiff's expert did not physically examine the patient, he believed that Lowery's symptoms were the result of inhaling fumes from the oil spill.[32]

Plaintiff's expert did not testify to the exposure levels or the length of exposure necessary to cause Lowery's symptoms, thereby failing to meet the general causation standard.[33] He was not able to show that Lowery was exposed to toxins from the oil spill. Plaintiff's expert failed to eliminate other potential causes of his symptoms, and he failed to establish a causal link between Lowery's early symptoms and the stomach hemorrhage, which surely required expert testimony.[34] Even assuming that the testimony of this "expert" was admissible, Chief Justice Markman opined that Lowery would have failed to meet his burdens for general and specific causation.[35]

"it is essential to have a qualified expert witness when there are questions of science and medicine"

While the Michigan Supreme Court need not have fully addressed the issue of expert testimony to demonstrate causation because there was expert testimony in *Lowery*, Chief Justice Markman nevertheless addressed the issue of whether expert testimony is required in toxic tort cases.[36] He explicitly states, "expert testimony on causation is necessary in a toxic tort cases when the legal proposition is beyond the common knowledge of an ordinary juror."[37] As in the present case, it is essential to have a qualified expert witness when there are questions of science and medicine. In order to meet his burden, Lowery needed a qualified expert to help inform the jury of the specific knowledge needed to establish causation in his case.

Is Any of This New and What Does it All Mean?

While Chief Justice Markman's concurrence and the Michigan Supreme Court's decision are certainly helpful in clarifying toxic tort law, the holding in *Lowery* is not a departure from existing

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[29] It is unlikely that Lowery's "experts" would have qualified as true experts under Michigan law. *See* Amicus Curiae Brief of Michigan Chamber of Commerce at *20-21, *Lowery v Enbridge Energy L.P.*, 2017 Mich LEXIS 1409 (No. 151600).

[30] *Lowery*, 898 NW2d at 908 (MARKMAN, C.J. concurring).

[31] Dr. Koziarski, the general and vascular surgeon who repaired Lowery's stomach hemorrhage, declined to testify as to the cause of Lowery's injury. *Id*. at 909.

[32] *Id.* at 909.

[33] *Id.* at 919-920.

[34] *Id.* at 923.

[35] *Id.* at 920, n. 20.

[36] *Id.* at 917-918.

[37] *Id.* at 907.

Michigan legal principles. There is little Michigan case law on the use of expert testimony in toxic court cases. One previous case on the subject, *Genna v. Jackson*,[38] which was heavily relied upon by the Michigan Court of Appeals in its decision, "decline[d] to adopt a per se rule requiring expert testimony in toxic tort cases."[39] Chief Justice Markman noted in his concurrence that he would "explicitly reject" interpreting the holding of *Genna* to mean that expert testimony is never required in toxic tort cases.[40] *Genna* involved "massitvely high levels of . . . mold toxins" and expert testimony regarding the deleterious health effects of mold.[41] Furthermore, the unique facts of that case make it easily distinguishable from most toxic tort cases. Unlike in *Genna*,[42] most toxic tort cases usually involve difficult questions of science and medicine that are beyond the common understanding of an ordinary juror.[43] As such, the Chief Justice Markman concurrence in the present case serves to clarify the need for expert witnesses in most toxic tort cases.

The decision in *Lowery* is consistent with other principles of Michigan law as well. In cases like *Lowery*, which involve questions of "complex science and the relationship between a triggering event and an alleged injury is outside of a lay juror's common knowledge,"[44] Michigan law has always required expert testimony. For example, medical malpractice cases and cases where causation inquiries are scientific in nature require expert testimony.[45] In *Lowery*, since the alleged cause and evolution of Lowery's symptoms were rooted in medicine, it follows logically that the court would require expert testimony to assist the finder of fact.

Lowery is also consistent with case law from other jurisdictions that requires expert testimony in toxic tort cases. For instance, the U.S. Court of Appeals for the Sixth Circuit required expert testimony to show both general and specific causation in toxic tort cases "because of the complex scientific assessments required."[46]

"*Lowery* will strike a positive balance between accessibility for plaintiffs and protection for defendants"

Looking to the future, *Lowery* will strike a positive balance between accessibility for plaintiffs and protection for defendants. Requiring expert testimony will continue to protect those plaintiffs who can sufficiently establish causation between a defendant's conduct and the harm suffered, while protecting defendants from tort claims with tenuous

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[38] *Genna v Jackson*, 286 Mich App 413 (2009).

[39] *Id.* at 418.

[40] *Lowery*, 898 NW2d at 919, n. 18.

[41] 286 Mich App at 420-421.

[42] In *Genna*, no expert testimony was needed, because there was a "sufficient logical sequence of cause and effect on which a jury could conclude that Defendants' leak could have caused Plaintiffs' injuries." Brief of Michigan Chamber of Commerce at *2, 2017 Mich LEXIS 1409 (No. 151600).

[43] Brief of Michigan Chamber of Commerce at *1, 2017 Mich LEXIS 1409 (No. 151600).

[44] *Id.* at *4.

[45] *Id.*

[46] *Pluck v BP Oil Pipeline Co.*, 640 F 3d 671, 677 (CA 6, 2011).

causation. Chief Justice Markman's concurrence in *Lowery* establishes a clear requirement for presenting expert testimony in toxic tort cases and provides timely guidance in Michigan toxic tort jurisprudence and in future litigation such as pending Flint water cases. These cases will likely involve scientific and medical queries about the link between lead levels in the Flint water supply and the plaintiffs' various alleged injuries.

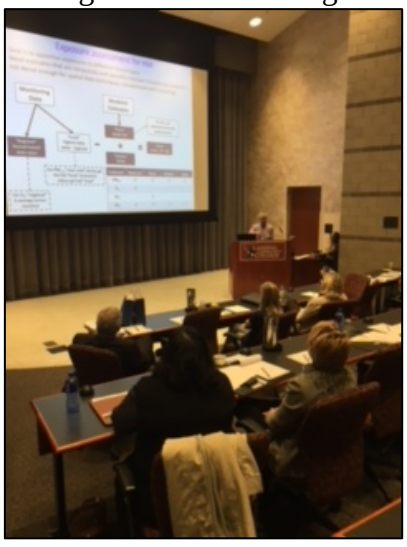
What you Might Have Missed

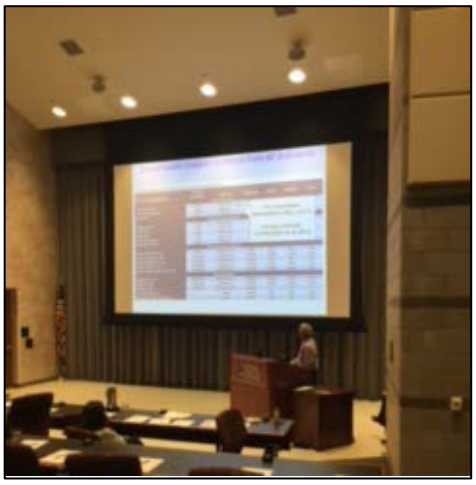
SBM NEXT Conference
ELS Annual Meeting
Sept. 28, 2017, Detroit

The Section's annual meeting was held in conjunction with the State Bar of Michigan NEXT conference at Cobo Hall in Detroit. Margrethe Kearney and Todd Schebor organized the programing for the meeting, which featured a presentation from Craig Hupp and Jennifer McKay providing the latest on Enbridge Line 5 and a presentation from Oday Salim on aquaculture in Michigan. Notably, the meeting concluded with remarks from Senator Rebecca Warren (above) on her involvement with environmental issues in the state. Dennis Donohue gave a report as the Section's outgoing chair and introduced Scott Steiner as the new Section chair (right). Scott discussed his plans as chair including his desire to recruit and involve more law students and young attorneys.

Joint Environmental Conference
Nov. 8, 2017, Lansing

The Joint Environmental Conference, co-sponsored by the Environmental Law Section and East Michigan & West Michigan Chapters of the Air & Waste Management Association was held at Lansing Community College's West Campus. The conference featured several panels focused on air and waste issues. The photos depict Stuart Batterman from the University of Michigan's School of Public Health presenting a break-out session on Community Action to Promote Healthy Environments. The key note lunch address was given by Howard Learner of the





Environmental Law and Policy Center. His address discussed the decentralization of environmental regulation and the uncertainty said decentralization has caused industry groups. Thank you to the Section's Air Committee for all of their efforts in planning this annual event. Program materials can be viewed in the West Michigan AWMA archive. If you attended the conference, please take this brief survey. The Section encourages your feedback to continually improve its programming.

Great Lakes Environmental Law Center Bash
Nov. 9, 2017, Detroit

The Great Lakes Environmental Law Center had its annual Blue Water Bash at Tony V's in Detroit. The director of the Center, Oday Salim, presented journalist Anna Clark (right) with the Center's Fourth Annual Award for Excellence in Environmental Journalism. Last year's recipient, Curt Guyette, is known for his role in breaking the silence surrounding the Flint water crisis. Anna's latest book, *The Poisoned City: Flint's Water and the American Urban Tragedy*, is set for publication this spring. Many attended the event and celebrated the Center's great successes this past year.

Upcoming Events

COUNCIL MEETING: The next Council meeting is tentatively scheduled for March 12 in Detroit, location TBA.

If you are not already a member of the Environmental Law Section of the State Bar of Michigan,

Join Us NOW

Membership dues are only $30 and FREE for law students and new members to the bar.

Making Energy Fun Again!
A FAQ on Michigan's Updated Implementation of the Public Utility Regulatory Policies Act

Margrethe Kearney, Jeffrey Hammons
Senior Staff Attorney, Associate Attorney
Environmental Law & Policy Center

Q: What is PURPA?

A: An alien from outer space that eats people. A PURPA People Eater! Just kidding. PURPA stands for the Public Utility Regulatory Policies Act, enacted by Congress in 1978. Congress enacted Section 210 of PURPA to encourage the development of small renewable energy and cogeneration and to reduce reliance on fossil fuels, thereby increasing American energy independence. Even though PURPA was enacted in 1978, I believe those goals remain important to Americans today.

Q: How does PURPA encourage development of renewable energy and cogeneration?

A: What is amazing about PURPA is that it encourages renewable energy and cogeneration with a simple and unexpected tool: competition. In states like Michigan, only a few utilities have the authority to sell power. PURPA tasks states—here the Michigan Public Service Commission—with setting what is called the "avoided cost" of energy. The avoided cost of energy represents the cost to the utility of the energy that it sells to its customers. PURPA requires utilities to purchase from small renewable energy producers and cogenerators (referred to in the law as "qualifying facilities," or "QFs") and the rate for such purchase is based on the utilities' avoided cost. PURPA created an incentive for utilities to manage their costs and created an incentive for low cost renewable energy generation.

Q: What does the avoided cost include?

A: Avoided cost obviously includes the cost of building a power plant to generate power, but it also includes the costs of transmission, losses that occur as the energy travels over power lines, the cost of complying with environmental laws that protect air and water quality, and the cost of "hedging" against future volatility in fuel prices. These are some significant costs a utility avoids by purchasing power from a QF, and there are also other costs, too, depending on a multitude of additional factors too numerous to list here.

Q: Why do those projects need PURPA? If QFs can make energy at the same or lower cost than the utility, why can QFs not sell it to people in Michigan?

A: In states like Michigan, where 90% of the market for electricity is a regulated monopoly, without PURPA, a small renewable energy project cannot merely connect to the grid and sell power to its community. Some competitive markets have developed since PURPA was enacted, but small renewable projects and cogenerators do not have access to those markets. In addition, the short-term prices in those markets do not truly reflect a utility's costs of producing power in a regulated state like Michigan. In Michigan, actual utility costs are recovered from customers through rates approved by the Commission for the majority of the market—not through prices set on a competitive market.

Q: Why does PURPA require utilities to purchase power from QFs? If the QF can really produce that power at or below the utility's own price, the utility would have an incentive to buy that power and lower prices to customers, right?

A: Unfortunately, there is not much of an incentive for regulated utilities in Michigan to buy power from a QF and lower prices for customers. PURPA recognized that there is an inherent preference for utilities to build their own generation and this self-generation preference creates barriers to non-utility generation—even where that generation is cost effective. Utilities make money by investing capital in building generating plants and infrastructure, and then recovering those costs in rates charged to customers. If utilities are buying energy and capacity from QFs, then utilities do not need to build as much or at all, which cuts into their revenue stream. If a utility is buying energy and capacity from small power producers and cogenerators, and then distributing it to consumers, there is not as much of an opportunity for the utility to make money off of that transaction.

Q: So, does PURPA increase prices for customers?

A: No, because the rate is based on avoided costs, it is equivalent to what the utility and its customers would already pay for the same energy and capacity. In addition, both customers and society benefit from increased energy independence, increased renewable energy and cogeneration development, and a reduction in fossil fuel dependence. The whole idea of avoided cost is that the utility is paying a QF what it would have cost the utility to generate that power on its own. As a result, there should not be any immediate effect on customer prices. Actually, over time, the utility will recognize that, as its own costs of generating power increase, there are an increasing number of QF projects that are cost effective under those higher prices. Therefore, the utility and its preference for self-generation will actually have an incentive to decrease costs. Hence, the conclusion that PURPA's requirement that a utility purchase QF power actually creates competition in what is otherwise a monopoly market, and this can help drive prices down in the end for customers.

Q: Prices should go down for customers if avoided cost was set lower than the utility's own costs, right? Why not just set it really, really low?

A: The problem is that a rate that is too low will not be sufficient to encourage development of QF capacity, even if the QF capacity costs less (in total or to ratepayers) than the utility's planned

new generation. There would be a whole group of QF projects that produce power at a lower cost than the utility, but above the really, really low avoided cost. Those projects would never be built, and we would miss out on the benefits those QF projects provide.

Q: How does the Michigan Commission set avoided costs?

A: The Commission recently opened dockets for each of Michigan's regulated utilities to set a methodology for avoided costs. Not all of those cases are over, so for some of the utilities we do not know the avoided cost formulation yet. But for the two largest utilities, DTE and Consumers, the Commission concluded that avoided cost should be calculated based on a proxy plant. Because avoided costs have two components—capacity and energy—the Commission used a different proxy unit for each of those components. The cost of a natural gas combustion turbine ("NGCT") is proxy for avoided capacity cost. The variable cost of a larger unit—a combined cycle natural gas plant ("NGCC")—is the proxy for avoided energy cost. The idea is that if a utility just needed capacity, it would build a NGCT, which is less expensive to build but smaller. Therefore using this fossil fuel-type of plant as a proxy for capacity conforms to PURPA's requirement and intent. Similarly, if a utility needed energy, it would want to build a NGCC. Of course, if you are going to build a larger, more expensive NGCC to use the energy, you need to account for the higher costs to do that, so there is an adder to the energy cost to account for that.

Q: Once the avoided cost is set, how does the utility actually get the power? Does the QF just show up on their doorstep, power in hand?

A: Not exactly. First, a QF needs to interconnect to the grid, and there is an entire process for doing that. It is important that the interconnection process follow the most up-to-date standards, but it is also important that the process not become unnecessarily difficult for QFs. Utilities should not be able to discourage QF projects and sidestep its PURPA requirements by implementing a difficult interconnection process. Once the QF is connected to the grid, then it could determine how much energy and capacity to provide and when. It is common for QFs to enter into long-term contracts with utilities, called Power Purchase Agreements ("PPAs"). A project of up to 2 MW can use what is referred to as the "standard offer," which means the parties do not need to negotiate a contract with the utility. For those smaller projects, the utility and the QF are both subject to the terms and conditions of the standard offer, without the need to negotiate. This process reduces transaction costs, which creates the transparency and certainty necessary to encourage development of these small renewable energy facilities.

Q: Why is it important for QFs to be able to enter into long-term contracts?

A: Long-term contracts are important for a lot of reasons. First, when there is a long-term contract, the utility can factor that contract into its long-term planning. That is good for customers, because it keeps utilities from building too many power plants. Second, long-term contracts allow the QF to get financing for the project. Whereas a utility knows it will be able to finance a power plant over its useful life, so too, do QFs need to be able to show that they have a long-term commitment from the utility in order to get financing for their own projects. In Michigan, a QF is entitled to up to a 20-year contract. Not providing long-term contracts would unfairly discriminate against QFs and undermine the goals of PURPA.

Q: How does Michigan compare to other states in setting avoided cost?

A: Even though PURPA requires states to periodically review avoided cost, most states have not paid much attention to it over the past few decades. This is partially due to the fact that, up until the last decade, renewable energy costs were higher than utility avoided costs. Now that renewable costs keep falling, interest in PURPA has renewed. It is encouraging that the Michigan Commission is taking the time to review avoided costs and thoroughly consider the right methodology. Other states, such as North Carolina, have seen strong and beneficial growth in renewable energy, especially solar, after setting fair avoided cost rates. A strong avoided cost rate will have a huge impact on Michigan's future energy independence and protect Michiganders from the harmful impacts of fossil fuel generation. And it can do all that without raising costs to customers!

Perfluoroalkyl Compounds: An Emerging Contaminant in Michigan

Richard Baron, Benjamin Fruchey, and Nicholas Andrew
Founding Partner, Associate Principal, Associate
Foley Baron Metzger Juip PLLC



Most contaminants share a common trait: stop their release and the ecosystem will dilute them, neutralize them, or degrade them until they are no longer a threat to human health or the environment. Yet some compounds do not seem to fit this mold. Specifically, greater attention and scrutiny is now being focused on the potential harmful effects of poly- and perfluoroalkyl substances (PFASs), compounds that appear to be highly mobile, easily enter the human body, and are persistent in the environment. PFASs are man-made, so there are no natural sources in the environment, yet they have been detected in the Arctic Circle and in other remote locations such as open ocean waters, indicating their ability to travel via wind and water.[1] Exposure to PFASs is already so widespread that they were detected in 95–100% of human blood samples in 1999–2000 and 2003–2004.[2] And due to the strength of PFASs' bonds, they are very stable in the environment,

[1] Agency for Toxic Substances and Disease Registry, Sources of Exposure to PFAS, (updated 2016) (accessed November 5, 2017).

[2] Agency for Toxic Substances and Disease Registry, Draft Toxicological Profile for Perfluoroalkyls, p. 24 (accessed November 5, 2017).

low in volatility, and are resistant to biodegradation, photoxidation, direct photolysis, and hydrolysis.[3] This combination of factors could create an enormous problem for the scientific and medical communities if it is confirmed that PFASs increase the likelihood of certain medical conditions in humans, even as new production of these compounds is waning worldwide. Furthermore, the discovery of multiple sites in Michigan where PFASs may have contaminated the soil and groundwater of local communities has thrust this issue into the limelight in Michigan specifically, while regulators at the State and federal level move slowly to develop a response.

Are PFASs Everywhere?

PFASs are a subset of perfluorinated chemicals, a broad group of compounds used to make products more resistant to stains and water damage.[4] Industrial quantities of PFASs, the two most popular being perfluorooctanoic acid (PFOA), used to make DuPont's Teflon, and perfluorooctane sulfonate (PFOS), used to make 3M's Scotchgard, have been manufactured since the 1940s.[5] PFASs have been used in fire-fighting foams (for suppressing gas fires), in nonstick pans, Gore-Tex and other waterproof clothing, electrical wire casings, fire and chemical resistant tubing, plumbing thread seal tape, eye glasses, tennis rackets, stain-proof coatings for carpets and furniture, fast food wrappers, microwave popcorn bags, bicycle lubricants, satellite components, ski wax, car seats, tents, shoes, and pizza boxes, as well as in the aerospace, automotive, building and construction, and electronics industries, as a friction reducer.[6] The result of this massive insertion of PFASs into everyday products has led to widespread human exposure. Once present, the most commonly used PFASs remain in the human body for many years; elimination half-times in humans are 3.8 years and 5.4 years for PFOA and PFOS, respectively.[7]

PFASs' Pathways to the Human Body

Food and water ingestion is the primary source of human exposure to PFASs. Another common exposure point, especially for children, is PFAS-treated carpets and upholstery through hand-to-mouth transfer.[8] People working where PFASs are made or used are often exposed to higher levels of these substances than the general population; these persons include chemical plant workers, carpet layers and certain firefighters.[9] Some communities near facilities where PFASs previously

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3 *Id.* at 31.

4 National Institute of Environmental Health Sciences, Perfluorinated Chemicals (PFCs), p. 1 (accessed November 5, 2017).

5 Garret Ellison, MLive, What are PFCs and why should you care?, (accessed November 5, 2017); *see also* Bill Walker and David Andrews, Environmental Working Group, Drinking Water for 5.2 Million People Tainted by Unsafe Levels of PFCs, (accessed November 5, 2017).

6 *Supra* n. 2, Draft Toxicological Profile for Perfluoroalkyls, p. 372; *supra* n. 4, Perfluorinated Chemicals (PFCs), p. 1.

7 *Supra* n. 2, Draft Toxicological Profile for Perfluoroalkyls, p. 33.

8 *Id.* at 437.

9 *Id.* at 438-439.

were manufactured had high levels of these substances in drinking water supplies, and this can lead to high rates of ingestion for these populations.[10] Similarly, the former use of PFASs in fire-fighting foams, especially on military bases, has resulted in the release of these substances to soil and groundwater.[11] In Michigan, five sites have already been identified as contaminating local drinking water: four different air force installations and a Wolverine (boots) World Wide tannery in Belmont.[12] At Wurtsmith Air Force base in Oscoda, sampling by the Michigan Department of Environmental Quality and the US Air Force identified elevated levels of PFAS contamination in some locally caught fish and drinking water wells which has been traced directly to firefighting foams used at the Wurtsmith base.[13] Sampling by the Michigan National Guard near Camp Grayling Airfield outside Grayling identified roughly 100 private wells that may contain high levels of PFASs due to the runoff of firefighting foams; sparking concern that other air force bases in the State may have the same issues.[14] At the Wolverine tannery, the Rogue River and local groundwater have shown the presence of PFASs due not to fire-fighting foam, but instead from a form of Scotchgard that was used to waterproof the company's boots for decades.[15]

The (Potential) Danger of PFASs

There have been no definitive studies linking the presence of PFASs in the body to any specific disease or disorder, but some results from testing on animals have raised concern among government agencies and industry and have led to a spate of lawsuits, most unresolved, relating to PFAS exposure.[16] In animal studies, some PFASs disrupt endocrine activity, reduce immune function, cause adverse effects to the liver, pancreas, and thyroid, create changes to blood cholesterol and triglyceride levels, and cause developmental problems in offspring exposed in the womb.[17] In particular, the fact that PFASs could be "endocrine disrupters" is a concern, since other similar disrupters, such as the pesticide DDT, have been shown to cause cancers and birth defects in humans. A number of studies have examined the carcinogenicity of PFASs and the health effects

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10 *Id.* at 25; 32-33.

11 United States Environmental Protection Agency, FACT SHEET PFOA & PFOS Drinking Water Health Advisories, pp. 1-3, (accessed November 5, 2017).

12 Garret Ellison, MLive, Toxic chemical foam plume found at National Guard base in Alpena, (accessed November 5, 2017).

13 *Supra* n. 5, What are PFCs and why should you care?

14 Garret Ellison, MLive, Toxic chemical foam plume discovered at Camp Grayling airfield, (accessed November 5, 2017).

15 Garret Ellison, MLive, Scotchgard chemical ails fish where tannery scraps litter river, (accessed November 5, 2017).

16 Sharon Lerner, The Intercept, The Teflon Toxin, (accessed November 5, 2017).

17 *Supra* n. 4, Perfluorinated Chemicals *(PFCs)*, p. 2.

they could create in humans; data from some human studies suggests that PFASs may also have effects on human health, while other studies have failed to find conclusive links.[18]

How to Eliminate PFASs

PFASs can be disposed of by separating solid waste from liquid waste, and then disposing of the dry PFAS solids in an approved industrial solid waste landfill or incinerating them at temperatures of 800°C.[19] Alternatively, public water systems can treat PFAS-impacted water with activated carbon or reverse osmosis systems to remove PFASs from drinking water.[20] In some communities, entities have provided bottled water to consumers while steps to reduce or remove PFASs from drinking water or to establish a new water supply are completed.[21] As a general rule, however, the presence of PFASs in air or water goes untreated unless localized land use and sampling verify that there are very high levels present in the community. In Michigan, the response to exposure sites largely has been to limit exposure from private residential wells at the source rather than clean up the contamination as a whole. Most current efforts to limit exposure are aimed at the installation of at-the-tap filter systems and provision of bottled water in homes.[22]

The Regulation (of lack thereof) of PFASs

Today, PFASs are considered "emerging contaminants" and are not subject to federal regulation. This is because under the Safe Drinking Water Act it takes years of study to develop enough data on toxicity for agencies like the United States Environmental Protection Agency (EPA) to enact regulations, and because there are so many poly- and perfluoroalkyl variants, it is difficult to assess the risk potential across the entire chemical class.[23] In 2012, EPA listed a number of perfluoroalkyl compounds, including prominent PFASs such as PFOA and PFOS, as suspected drinking water contaminants.[24] In May 2016, EPA published health advisory guidelines for PFOS and PFOA that suggest prolonged exposure over 70 parts-per-trillion can cause health problems; this is equal to about a drop of water in 20 Olympic-sized swimming pools.[25] Since 2013, an EPA-mandated

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[18] *Supra* n. 2, Draft Toxicological Profile for Perfluoroalkyls, pp. 33-37; supra n. 4, Perfluorinated Chemicals (PFCs), p. 2.

[19] *Supra* n. 2, Draft Toxicological Profile for Perfluoroalkyls, pp. 372-373.

[20] American Water Works Association, Perfluorinated Compounds: Treatment and Removal, (accessed November 5, 2017).

[21] *Id.*

[22] Garret Ellison, MLive, Toxic chemicals pollute drinking water near old tannery dump, (accessed November 5, 2017).

[23] *Supra* n. 11, FACT SHEET PFOA & PFOS Drinking Water Health Advisories, p. 4.

[24] *Id.*

[25] *Id.* at 2.

testing program has detected elevated levels of the chemicals in 52 public water systems across the country. [26] In 19 states plus two Pacific island territories, those systems had at least one sample contaminated with either PFOA or PFOS at an amount greater than the new lifetime health advisory level.[27] In Michigan, the Department of Health and Human Services (MDHHS) has set non-enforceable exposure thresholds of 11 parts-per-trillion for PFOS and 42 parts-per-trillion for PFOA; levels which two larger water systems in the State have been found to exceed.[28] MDHHS has also issued an advisory cautioning consumers to either stop or limit eating fish from waters containing PFOA or PFOS, which at this point is limited to areas around Oscoda where contaminants are known to be present at higher concentrations.[29] Just last year, Governor Snyder signed into law PA 545 (2016), which amends the State's Safe Drinking Water Act to specifically compel the federal government to provide an alternative water supply when it is found to have caused the original water supply to become contaminated.[30] The Department of Defense, who is responsible for the four airfields cited as sources of PFAS contamination, has thus far pleaded immunity from such State laws, and will likely await to be compelled by federal laws or regulations not yet in existence.[31]

> "Chemical manufacturers have recently . . . begun phase-outs of [PFASs] compounds."

Chemical manufacturers have recently become responsive to concerns about PFASs; and have begun phase-outs of those compounds. In 2006, eight major companies agreed to participate in EPA's voluntary PFOA Stewardship Program, which required commitments to reduce facility emissions and production of PFOA and related chemicals, and to work toward the eventual elimination of these substances.[32] The chemical industry has responded to these phase-outs by shifting production to next-generation perfluoroalkyl compounds with smaller carbon chains.[33] Small-chain compounds, while still persistent in the environment, are generally less toxic and less

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26 *Supra* n. 5, Drinking Water for 5.2 Million People Tainted by Unsafe Levels of PFCs.

27 *Id.*

28 *Supra* n. 20, Perfluorinated Compounds: Treatment and Removal; Garret Ellison, MLive, EPA data shows toxic PFCs in two large Michigan water systems, (accessed November 5, 2017).

29 Michigan Department of Health and Human Services, MDCH Issues "Do Not Eat" Fish Advisory for Clarks Marsh in Iosca County, (accessed November 5, 2017).

30 Garret Ellison, MLive, Michigan law targets Oscoda water, but will the military follow it?, (accessed November 5, 2017).

31 Garret Ellison, MLive, Air Force thumbs its nose at new Michigan safe water law, (accessed November 5, 2017).

32 *Supra* n. 2, Draft Toxicological Profile for Perfluoroalkyls, pp. 375-385.

33 Environmental Working Group, Poisoned Legacy: Where Consumers Encounter PFCs Today, (accessed November 5, 2017).

bio-accumulative than PFASs.[34] Although recent monitoring data continues to show widespread human exposure, the United States Department of Health and Human Services has observed that the levels of PFASs in Americans' blood appear to be declining, which demonstrates that these changes in chemical manufacturing may be having a positive effect on this potential problem.[35] This will not, however, reduce the concerns about high-level localized PFAS exposure that adjacent communities may have to contaminated sites, such as the airfields and tanneries in Michigan.

[34] *Supra* n. 2, Draft Toxicological Profile for Perfluoroalkyls, pp. 25; 391.

[35] *Supra* n. 11, FACT SHEET PFOA & PFOS Drinking Water Health Advisories, p. 1.

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