CHAPTER 28

EXPERT OPINIONS IN ENVIRONMENTAL LITIGATION GATEKEEPING 10 YEARS AFTER DAUBERT

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Abstract: Environmental litigation almost always involves scientific issues and expert opinions, often with multiple experts in different disciplines. In 1993, the United States Supreme Court issued its landmark decision in Daubert v. Merrell Dow Pharmaceuticals, Inc., 509 U.S. 579 (1993), which made significant changes in the standards for admissibility of expert opinions in federal courts. The Supreme Court established a gatekeeping requirement under which courts must screen expert opinions for reliability and exclude “junk science.” The Court also established a new, more flexible test to be used in this process. These standards have now become better defined through their application by courts over the ten years since Daubert, including a number of environmental cases. A recent example of the application of these standards to an environmental case is Freeport-McMoran Resource Partners, L.P. v. B-B Paint Corp., et al., 56 F.Supp. 2d 823 (E.D. Mich. 1999), a private party CERCLA case in which one of the authors successfully argued a motion to exclude expert testimony for a group of 12 defendants, resulting in exclusion of the opinions and a judgment for the defendants. The expert in the case was a PhD. chemist and had served as an expert witness in over 180 cases. While admissibility of expert opinions is primarily the responsibility of attorneys, it is important for environmental professionals to understand the issues, both to assist attorneys and to take them into consideration in projects which may later result in litigation. This paper explores current standards for expert opinions in environmental litigation in both federal and state courts.

Key words: environmental litigation, expert opinions, Daubert, Frye, Federal Rules of Evidence
1. INTRODUCTION

In 1993, the United States Supreme Court issued its landmark decision in *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579, 113 S. Ct. 2786 (1993), which made significant changes in the standards for admissibility of expert opinions in federal courts. The Supreme Court established a gatekeeping requirement under which courts must screen expert opinions for reliability and exclude “junk science.” The Court also established a new, more flexible test to be used in this process. An amendment to Federal Rule of Evidence 702\(^7\), which became effective in December 2000, codified *Daubert’s* general approach. These standards have now become better defined through their application by courts over the ten years since *Daubert*, including a number of environmental cases. Because environmental cases almost always involve scientific issues and expert opinions, *Daubert* and its progeny have had and will continue to have a major impact on environmental litigation. While admissibility of expert opinions is primarily the responsibility of attorneys, it is important for environmental professionals to understand the issues, both to assist attorneys and to take them into consideration in projects which may later result in litigation.

2. THE DAUBERT STANDARDS

Rule 702 of the Federal Rules of Evidence governs the admissibility of expert opinions. The rule, in its original form, provided:

> If scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training, or education, may testify thereto in the form of an opinion or otherwise.

In *Daubert*, the Supreme Court held that district court judges have a “gatekeeping role” to determine evidentiary reliability of scientific evidence before it is admitted and redefined the requirements for admissibility of scientific evidence under Rule 702.

There are accordingly two distinct requirements enunciated in *Daubert*: (1) the procedural gatekeeping function for trial courts and (2) the newly defined substantive analysis for determining admissibility of scientific

Evidence. The gatekeeping function requires a preliminary assessment by the district court of the proffered opinions before they are admitted:

Faced with a proffer of expert scientific testimony, then, the trial judge must determine at the outset, pursuant to Rule 104(a), whether the expert is proposing to testify to (1) scientific knowledge that (2) will assist the trier of fact to understand or determine a fact in issue. This entails a preliminary assessment of whether the reasoning or methodology underlying the testimony is scientifically valid and of whether that reasoning or methodology properly can be applied to the facts in issue.

509 U.S. at 592-593, 113 S. Ct. at 2796. (Emphasis added).\(^8\)

Admissibility is based on a two-step analysis in which the trial court determines (1) whether the proffered expert opinion reflects scientific knowledge, whether the findings are derived by the scientific method and whether the work amounts to good science (reliability), and (2) whether the proffered expert opinion is relevant to the task at hand (relevance)\(^9\). \(E.g.,\) Smelser v. Norfolk Southern Railway Co., 105 F.3d 299, 303 (6th Cir. 1997), cert. denied, 118 S. Ct. 67 (1997).

For the first step in this analysis, the Supreme Court provided a list of nonexclusive factors, which it characterized as “general observations,” which a court should analyze in determining the reliability of scientific evidence:

1. Whether the scientific theory or technique “can be (and has been) tested”;
2. Whether the scientific theory or technique “has been subjected to peer review and publication”;
3. “The known or potential rate of error”;
4. “The existence and maintenance of standards controlling the technique’s operation”; and
5. “General acceptance” in the “relevant scientific community.”

509 U.S. at 593-594; 113 S.Ct. at 2796-2797. (Emphasis added).

The Supreme Court noted that reviewing courts, in applying the Daubert analysis, must focus “solely on [the expert’s] principles and methodology, not on the conclusions that they generate.” 509 U.S. at 595, 113 S. Ct. at 2797.

In adopting the Daubert analysis, the Supreme Court held that the more restrictive approach to admissibility of experts of Frye v. United States, 293 F. 1013 (D.C. Cir. 1923), which had been followed in federal courts for years, was superceded by the adoption of the Federal Rules of Evidence.

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\(^8\) Fed. R. Evid. 104(a) governs determinations of preliminary questions of admissibility of evidence generally.

\(^9\) Fed. R. Evid. 401-403 govern relevance generally.
Frye focused on “general acceptance” by scientists in the particular field of the proposed expert opinions:

Just when a scientific principle or discovery crosses the line between the experimental and demonstrable stages is difficult to define. Somewhere in this twilight zone the evidential force of the principle must be recognized, and while courts will go a long way in admitting expert testimony deduced from a well-recognized scientific principle or discovery, the thing from which the deduction is made must be sufficiently established to have gained general acceptance in the particular field to which it belongs.

293 Fed. at 1014. Under this test, the underlying scientific principle(s) and methodology employed must be generally accepted by the relevant scientific community.10

Significantly, the Supreme Court viewed the Frye test as overly restrictive and replaced it with the more flexible Daubert analysis. Because the new test is more flexible, a wider range of expert opinions should be admissible after Daubert than was previously admissible under Frye. However, because of the procedural gatekeeping function articulated by the Supreme Court, a Daubert analysis has often resulted in exclusion of the proffered expert opinion. In addition, some courts have incorrectly applied Daubert’s “general observations” almost as a mandatory checklist for admissibility rather than as part of a flexible analysis. Three surveys, in 1991, 1998 and 1999, found that Federal judges were more likely in 1998 than in 1991 to scrutinize expert opinions before trial and to then limit or exclude the proffered opinions. (Krafka, 2002)

3. APPLICATION OF DAUBERT

3.1 U. S. Supreme Court

The Supreme Court has decided Daubert issues twice since its original 1993 decision.11 In General Electric Co. v. Joiner, 522 U.S. 136, 118 S. Ct.

10 Some courts, in applying Frye, have gone beyond this requirement and held that the methodology and the conclusion must both be generally accepted. E.g., Thomas v. the West Bend Co., Inc., 760 A.2d 1174, 1179 (Pa. Super. 2000), appeal denied, 2001 WL 501438 (Pa. 2001).

11 In addition, in Weisgram v. Marley Co., 528, U.S. 440, 120 S. Ct. 1011 (2000), the U.S. Supreme Court held that a court of appeals may direct entry of judgment as a matter of law where it determines that evidence was erroneously admitted and that the remaining, properly admitted evidence is insufficient to support a verdict. The evidence which the
512 (1997), the Court held that the test for appellate review of admissibility of expert testimony is whether there was an abuse of discretion in admitting or excluding the expert testimony.12

Significantly, the Supreme Court also held that the gatekeeping function is not limited to evaluation of methodology, as it stated in *Daubert*, but also properly includes a review of the connection between the methodology and the expert’s conclusions:

But conclusions and methodology are not entirely distinct from one another. ... [N]othing in either *Daubert* or the Federal Rules of Evidence requires a district court to admit opinion evidence that is connected to existing data only by the *ipse dixit* of the expert. A court may conclude that there is simply too great an analytical gap between the data and the opinion offered.

522 U.S. at 146, 118 S.Ct. at 519.

Most recently, in *Kumho Tire Co., Ltd. v. Carmichael*, 526 U.S. 137, 119 S. Ct. 1167 (1999), the Supreme Court held that the *Daubert* analysis applies to all expert testimony based on “technical or other specialized knowledge” and is not limited to scientific opinions. With respect to technical opinions, however, the *Daubert* factors have to be adjusted to fit the facts of the particular case, with the goal of testing the reliability of the proffered expert opinion. 526 U.S. at 149-151, 119 S. Ct. at 1175. The Court noted that the *Daubert* factors are intended to be “helpful, not definitive” and that district courts have “considerable leeway in deciding in a particular case how to go about determining whether particular expert testimony is reliable.” 526 U.S. at 151-152, 119 S. Ct. at 1175-1176. The specific *Daubert* factors are to be applied by a district court “... where they are reasonable measures of the reliability of expert testimony.” Id.

3.2 Courts of Appeals and District Courts

The Advisory Committee Note to the recent amendment to Rule 702 contains a list of additional factors which federal courts have applied in determining the reliability of expert opinions:

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12 Where the issue is whether or not the district court applied the proper legal standard under the Federal Rules of Evidence, review is plenary. Review of the district court’s application of the correct legal standard is for abuse of discretion. *E.g.*, *Tormenia v. First Investors Reality Co., Inc.*, 251 F.3d 128, 134-135 (3d Cir. 2000).

Eight Circuit found was erroneously admitted was expert testimony which the court found to be inadmissible under *Daubert*. The admissibility of the expert testimony was not an issue before the Supreme Court.
1. Whether experts are “proposing to testify about matters growing naturally and directly out of research they have conducted independent of the litigation, or whether they have developed their opinions expressly for purposes of testifying.” *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 43 F.3d 1311, 1317 (9th Cir. 1995) (on remand).

2. Whether the expert has unjustifiably extrapolated from an accepted premise to an unfounded conclusion. *See General Elec. Co. v. Joiner*, 522 U.S. 136, 146 (1997) (noting that in some cases a trial court “may conclude that there is simply too great an analytical gap between the data and the opinion proffered”).

3. Whether the expert has adequately accounted for obvious alternative explanations. *See Claar v. Burlington N.R.R.*, 29 F.3d 499 (9th Cir. 1994) (testimony excluded where the expert failed to consider other obvious causes for the plaintiff’s condition). Compare, *Ambrosini v. Labarraque*, 101 F.3d 129 (D.C. Cir. 1996) (the possibility of some uneliminated causes presents a question of weight, so long as the most obvious causes have been considered and reasonably ruled out by the expert).

4. Whether that expert “is being as careful as he would be in his regular professional work outside his paid litigation consulting.” *Sheehan v. Daily Racing Form, Inc.*, 104 F.3d 940, 942 (7th Cir. 1997). *See Kumho Tire Co. v. Charmichael*, 119 S.Ct. 1167, 1176 (1999) (*Daubert* requires the trial court assure itself that the expert “employs in the courtroom the same level of intellectual rigor that characterizes the practice of an expert in the relevant field”).

5. Whether the field of expertise claimed by the expert is known to reach reliable results for the type of opinion the expert would give. *See Kumho Tire Co. v. Carmichael*, 119 S.Ct. 1167, 1175 (1999) (*Daubert*’s general acceptance factor does not “help show that an expert’s testimony is reliable where the discipline itself lacks reliability, as, for example, do theories grounded in any so-called generally accepted principles of astrology or necromancy.”); *Moore v. Ashland Chemicals, Inc.*, 151 F.3d 269 (5th Cir. 1998) (en banc) (clinical doctor was properly precluded from testifying to the toxicological cause of the plaintiff’s respiratory problem, where the opinion was not sufficiently grounded in scientific methodology); *Sterling v. Velsicol Chem. Corp.*, 855 F.2d 1188 (6th Cir. 1988) (rejecting testimony based on “clinical ecology” as unfounded and unreliable).

Advisory Committee Note to 2000 Amendment to Rule 702.

Applying these additional factors as part of a *Daubert* analysis, the Sixth Circuit and Ninth Circuit have held that particularly close scrutiny is required where expert opinions have been developed for litigation, rather than in the regular practice of the expert’s profession:
These factors are to assist the court in determining “whether the analysis undergirding the experts’ testimony falls within the range of accepted standards governing how scientists conduct their research and reach their conclusions.” Daubert (on remand), 43 F.3d at 1316. The Ninth Circuit has added another factor to assist the court in its inquiry: “whether the experts are proposing to testify about matters growing naturally and directly out of research they have conducted independent of the litigation, or whether they have developed their opinions expressly for purposes of testifying” because the former “provides important, objective proof that the research comports with the dictates of good science.” Id. at 1317.

Smelser, 105 F.3d at 303 (quoting from Daubert on remand).

The Ninth Circuit’s opinion in Daubert (on remand) explains this additional special scrutiny for litigation opinions:

One very significant factor to be considered is whether the experts are proposing to testify about matters growing naturally and directly out of research they have conducted independent of litigation, or whether they have developed their opinions expressly for purposes of testifying. . . . In determining whether proposed expert testimony amounts to good science, we may not ignore the fact that a scientist’s normal workplace is the lab or in the field, not the courtroom or lawyer’s office.

If the proffered expert testimony is not based on independent research, the party proffering it must come forward with other objective, verifiable evidence that the testimony is based on scientifically valid principles.


Under this approach, the party seeking to have the expert opinion admitted has the burden of showing that the expert’s conclusions are “based on sound science” which requires an “objective, independent validation of the expert’s methodology.” Smelser, 105 F.3d at 303.

Experience alone may qualify a witness to testify as an expert if reliability of the opinion is established. The Advisory Committee Note to the 2000 Amendment recognizes that an expert may be qualified based on experience:

Nothing in this amendment is intended to suggest that experience alone – or experience in conjunction with other knowledge, skill, training or education – may not provide a sufficient foundation for expert testimony. To the contrary, the text of Rule 702 expressly contemplates that an expert may be qualified on the basis of experience. In certain fields,
experience is the predominant, if not sole, basis for a great deal of reliable expert testimony. See, e.g. United States v. Jones, 107 F.3d 1147 (6th Cir. 1997) (no abuse of discretion in admitting the testimony of a handwriting examiner who had years of practical experience and extensive training, and who explained his methodology in detail); Tassin v. Sears Roebuck, 946 F.Supp. 1241, 1248 (M.D.La. 1996) (design engineer’s testimony can be admissible when the expert’s opinions “are based on facts, a reasonable investigation, and traditional technical/mechanical expertise, and he provides a reasonable link between the information and procedures he uses and the conclusions he reaches”). See also Kumho Tire Co. v. Carmichael, 119 S.Ct.1167, 1178 (1999) (stating that “no one denies that an expert might draw a conclusion from a set of observations based on extensive and specialized experience.”).

A recent district court case which analyzed an expert opinion based solely on the expert’s knowledge and experience is Pappas v. Sony Electronics, Inc., 136 F. Supp. 2d 413 (W.D. Pa. 2000), a case involving the cause of a fire in a residence. In Pappas, the court excluded an electrical engineer’s testimony concerning the cause of the fire where the engineer’s opinions were based solely on his knowledge and experience and he failed to establish the reliability of his methodology. In rejecting the proffered opinion, the court observed:

… In short, Brugger’s opinion is based on nothing more than his training and years of experience as a fire investigator and engineer. While there may be cases when experience and training alone provide an adequate foundation for an expert opinion under Rule 702, this is not one of them. See, e.g., Oddi, 234 F.3d at 157 [FN16]

FN16. Before expert testimony grounded solely in knowledge and experience can be admissible under Rule 702, the expert must still prove that his methodology is reliable. In such cases, the expert may do so by: 1) discussing his experience and knowledge in detail; 2) explaining the methods he has used in the past; 3) indicating the success or failure that he has enjoyed in employing these methods; and 4) testifying about how he used the same methods in the investigation at issue. At the Daubert hearing, Brugger did not present this kind of detailed testimony.

136 F. Supp. 2d at 425.

While Daubert was intended to make admissibility of expert testimony more flexible, it is often better known for excluding unreliable expert opinions as “junk science.” This is the case because district courts have been
giving proffered expert testimony close scrutiny under the gatekeeping procedure which *Daubert* established. A survey of federal judges by the Federal Judicial Center in 1998 reported that “[j]udges were more likely to scrutinize expert testimony before trial and less likely to admit expert testimony in 1998 than in 1991.” (Johnson, 2000) However, according to the Advisory Committee Note to Rule 702, acceptance of expert opinions, rather than exclusion, has generally been the result in cases applying *Daubert*:

A review of the case law after *Daubert* shows that the rejection of expert testimony is the exception rather than the rule. *Daubert* did not work a “seachange over federal evidence law,” and “the trial court’s role as gatekeeper is not intended to serve as a replacement for the adversary system.” *United States v. 14.38 Acres of Land Situated in Leflore County, Mississippi*, 80 F.3d 1074, 1078 (5th Cir. 1996).

4. ADVISORY COMMITTEE NOTE TO 2000 AMENDMENT TO RULE 702

The Federal Judicial Center has prepared a *Reference Manual on Scientific Evidence*, now in its second edition, to assist federal judges in managing scientific evidence. A copy of the manual is included in *Moore’s Federal Practice*. It is also available on the Internet at www.fjc.gov, under “Publications.” This manual is an important reference for attorneys proffering and opposing scientific evidence and for expert witnesses because it is an official publication used by federal judges.

Another helpful reference is *Scientific Evidence Review, Monograph No. 4* (1999), published by the American Bar Association Section of Science and Technology. This 466-page book includes a general analysis of *Daubert* and its progeny, as well as discussion of their application in each of the federal courts of appeals and each of the states. In 2003, the American Bar Association published *Scientific Evidence Review – Admissibility of Scientific Evidence in the Courtroom, Monograph No. 6*, which continues the analysis.

Finally, the Advisory Committee Note to the 2000 Amendment to Rule 702 contains an overview of *Daubert* and the cases applying it.

On some occasions, federal courts have employed court-appointed expert witnesses, either to advise the court on expert issues or to actually testify at trial. Federal Rule of Evidence 706 governs court-appointed experts. The *Reference Manual on Scientific Evidence* (Second Edition) contains a
discussion of court-appointed experts at pages 59 through 63, both under Rule 706 and under district courts’ inherent powers.

In the fall of 1998, the American Academy for the Advancement of Science started a pilot program, Court Appointed Scientific Experts, to assist federal judges in obtaining independent scientific and technical experts. The project is designed to help judges locate highly qualified scientists and engineers to serve as experts for the courts, rather than for the litigants. Information on the project is available at www.aaas.org/spp/case/case.htm.

5. AMENDMENT TO FEDERAL RULE 702

Rule 702 was amended, effective December 1, 2000, to codify the general approach adopted by the Supreme Court in Daubert. The original language of Rule 702 remains the same. Three specific requirements (in bold below) have been added to the rule:

Rule 702. Testimony by Experts

If scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training, or education, may testify thereto in the form of an opinion or otherwise, if (1) the testimony is based upon sufficient facts or data, (2) the testimony is the product of reliable principles and methods, and (3) the witness has applied the principles and methods reliably to the facts of the case.

This amendment “affirms the trial court’s role as gatekeeper and provides some general standards the trial court must use to assess the reliability and helpfulness of proffered expert testimony.” It does not attempt to codify the specific Daubert factors enunciated by the Supreme Court as “general observations.” Advisory Committee Note to 2000 Amendment to Rule 702.

6. BASES FOR EXPERT OPINIONS

An important consideration in admissibility and sufficiency of expert opinions is the grounds upon which an expert may base his or her opinion. The Federal Rules of Evidence provide substantial flexibility in this area. Rule 703 provides:
The facts or data in the particular case upon which an expert bases an opinion or inference may be those perceived by or made known to the expert at or before the hearing. If of a type reasonably relied upon by experts in the particular field in forming opinions or inferences upon the subject, the facts or data need not be admissible in evidence in order for the opinion or inference to be admitted. ...

There are, however, limits to this flexibility, and courts have held that it may not be used to permit a testifying expert to serve as “a mouthpiece” for another nontestifying expert. This rule requires careful consideration in preparation of an environmental case.

A good example of the application of this rule in an environmental case is *Dura Automotive Systems of Indiana, Inc. v. CTS Corp.*, 285 F.3d 609 (7th Cir. 2002), a CERCLA contribution case involving groundwater contamination. A company which was required by EPA to clean up contamination near its plant sought reimbursement from the owner of a nearby plastics manufacturer.

Based on *Daubert*, the District Court excluded the company’s sole expert witness, a hydrogeologist, because he admitted that he was not an expert in the hydraulic models QuickFlow and SLAEM, and sought to testify concerning the results of modeling performed by professional groundwater modelers in his firm.\(^\text{13}\)

In affirming the exclusion of the opinions, the Court of Appeals noted that construction of the models was an “iterative process” and that the “soundness of the underlying judgment” of the modelers was at issue and it was, accordingly, proper to prohibit the hydrogeologist from testifying concerning it.

The Court concluded:

Had Dura wanted to use SLAEM and QuickFlow to determine the current capture zone of the Elkhart Field, we might well have a different case; such use might be quite routine. Dura wanted to use these models to determine the capture zone twenty years ago. The affidavits make clear that adapting the models to that use required a host of discretionary expert judgments for the [modelers], not [the hydrogeologist], to make.

285 F. 3d at 615.

When an environmental dispute is in litigation, it is important to carefully document all of the underlying tasks for an expert opinion (sampling plan, sample collection, lab analysis, modeling, etc.) and to make sure that a foundation can be established for its admissibility. This may require

\(^{13}\) The company later sought to add opinions by the modelers, but the court excluded them because it was six months beyond the deadline under the expert disclosure rules.
testimony of multiple experts if they exercised their own professional judgment in the process.

7. **DAUBERT IN THE STATE COURTS**

Before the Supreme Court’s *Daubert* decision, most states applied the *Frye* test or similar tests to determine admissibility of expert testimony. State courts are now facing the issue of whether to adopt *Daubert* or stay with their established tests for admissibility of expert opinions. Some states have adopted the *Daubert* test (e.g., Connecticut and Texas) while others continue to employ the *Frye* test, either because they have declined to adopt *Daubert* or have deferred decision on the issue (e.g., Illinois, Minnesota and New York). Still other states have their own tests which differ from both *Daubert* and *Frye* (e.g., South Carolina and Wisconsin). This section reviews the approaches recently taken by Pennsylvania, Michigan, and Massachusetts in deciding this issue. Pennsylvania and Michigan courts have continued to use the *Frye* test, although Michigan has adopted a *Daubert* approach by statute for personal injury and property damages cases. Massachusetts courts have generally adopted the *Daubert* approach.

7.1 **Pennsylvania Courts**

In 1998, Pennsylvania adopted Pennsylvania Rule of Evidence 702 which is modeled on Federal Rule 702, with some variation. The Comment to Pa.R.E. 702 expressly notes:

Adoption of Pa.R.E. 702 does not alter Pennsylvania’s adoption of the standard in *Frye v. United States*, 293 F. 1013 (D.C. Cir. 1923), which requires scientific evidence to have “general acceptance” in the relevant scientific community. ... Pennsylvania courts have not yet decided whether the rationale in *Daubert* supercedes or modified the *Frye* test in

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14 The authors acknowledge the assistance of Jennifer A. Schnore, an associate at Thorp Reed & Armstrong, LLP, in updating the state law materials.


As the Frye court so elegantly stated, [ ] ‘While courts will go a long way in admitting expert testimony deduced from a well-recognized scientific principle or discovery, the thing from which the deduction is made must be sufficiently established to have gained general acceptance in the particular field in which it belongs.’ *Frye*, 293 F. at 1103. In this single, simple sentence, the Frye court recognized that the essence of admissibility is general acceptance: that a principle or discovery can fall by the wayside as science advances is just another way of saying it is not generally accepted. We therefore conclude that we are merely stating the law in Pennsylvania when we state they Frye applies only to novel science.

Id. at 1110.

Importantly, the Pennsylvania Supreme Court is currently deciding *Grady v. Frito-Lay*, which may determine whether Pennsylvania will continue to employ evidence standards established in Frye or if Pennsylvania will adopt the Daubert test. 789 A.2d 735 (Pa. Super. 2001) (en banc), allocatur granted, 800 A.2d 294 (Pa. 2002) (oral arguments were held in March 2003). When it granted the Petition for Allowance of Appeal, the court instructed the parties to address the effect of Frye and Daubert on the sole issue of whether the Superior Court correctly applied the law when it reversed the decision of the trial court to exclude the testimony of Dr. Beroes Ph.D., P.E., and associate professor emeritus of chemical engineering at the University of Pittsburgh. *Grady*, 800 A.2d 294 (Pa. 2002). Id. Dr. Beros created and conducted an experiment that allegedly proved that a Dorito chip could tear the walls of the esophagus. *Grady*, 789 A.2d at 738-39.
Nonetheless, until the court renders an opinion on *Grady*, if proceeding in a Pennsylvania state court and the methodologies of novel expert scientific evidence are at issue, counsel should argue their positions under the *Frye* standard, or perhaps, alternatively, under both *Frye* and *Daubert*.

### 7.2 Michigan Courts

Michigan courts also continue to generally apply the *Frye* test rather than the *Daubert* test for the admissibility of expert testimony. Michigan refers to its test as the *Davis-Frye* test. See, *People v. McMillan*, 539 N.W.2d 553, 555 (Mich.App. 1995) (declining to apply *Daubert* absent a ruling by the Michigan Supreme Court displacing *Davis-Frye*).

The Michigan Court of Appeals decision in *Nelson v. American Sterilizer Co.*, 566 N.W.2d 671, 673-674 (Mich.App. 1997), however, appears to be a departure from this general rule. There, the court placed no express reliance on the *Davis-Frye* test. Rather, in applying Michigan Rule of Evidence 702, it cited to *Daubert* and applied a broad standard of reliability based on the holdings in numerous federal cases.

In 1999, the Michigan Court of Appeals again addressed the issue in *Anton v. State Farm Mutual Automobile Insurance Co.*, 607 N.W.2d 123, 127 (Mich.App. 1999). Though the court cited heavily to the opinion in *Nelson*, it maintained that it was applying the *Davis-Frye* test for admitting expert testimony. *Id*. The court expressly declined to address the continued applicability of the *Davis-Frye* test under Michigan law. *Id*. at 127. However, the court noted that Michigan Rule of Evidence 702, “unlike its federal counterpart, incorporates a ‘recognized’ standard for the admissibility of scientific evidence.” *Id*. 607 N.W.2d at 127 n.3. Michigan Rule of Evidence 702 begins with “If the court determines that recognized scientific, technical or other specialized knowledge will assist the trier of fact ...” (Emphasis added.) This language appears to refer to a variation of the “general acceptance” required under the *Frye* test.

It is notable that, in 1996, the Michigan Legislature passed a law outlining the factors which a court must consider in determining whether to admit expert testimony in actions for the death of a person or for injury to a person or property. See M.C.L. § 600.2955(1) (1996). In *Greathouse v. Rhodes*, the Michigan Court of Appeals noted that, in passing § 600.2955(1), the Legislature apparently intended to codify the holding in *Daubert*. 618 N.W.2d 106 (Mich. App. 2000), *rev’d on other grounds*, 650 N.W.2d 351 (Mich. App. 2001).
7.3 Massachusetts Courts

Massachusetts employed the *Frye* “general acceptance” test until the Massachusetts Supreme Judicial Court decided *Commonwealth v. Lanigan*, 641 N.E. 2d 1342 (Mass. 1994). In *Lanigan*, the defendant appealed his conviction for rape and indecent assault and battery on the ground that the trial court erroneously admitted incriminating DNA evidence. Id. at 1344-45. The court acknowledged that it traditionally applied a *Frye* analysis when determining the admissibility of expert testimony based on scientific knowledge, but that it had applied *Frye* flexibly. Id. at 1348. The court, faced with the Commonwealth urging that it adopt *Daubert* and abandon *Frye*, held the following:

We accept the basic reasoning of the *Daubert* opinion because it is consistent with our test of demonstrated reliability. We suspect that general acceptance in the relevant scientific community will continue to be the significant, and often the only, issue. We accept the idea, however, that a proponent of scientific opinion evidence may demonstrate the reliability of validity of the underlying scientific theory or process by some other means, that is, without establishing general acceptance.

Id. at 1349.

In *Commonwealth v. Senior*, the court reaffirmed that in the *Lanigan* case, it adopted *Daubert* “in part.” 744 N. E.2d 614, 618 (Mass. 2001). The *Senior* court held that “[u]nder the *Daubert-Lanigan* standard, although general acceptance is a relevant factor, it is not the ‘essential ingredient.’ Indeed, the ultimate test is the reliability of the theory or process underlying the expert’s testimony.” Id. (citations omitted).

Hence, Massachusetts has not specifically adopted the *Daubert* four-part test for evaluating expert testimony, but it has relied on its principles extensively when reviewing the admissibility of expert scientific testimony.

8. DAUBERT IN FEDERAL ENVIRONMENTAL CASES

The *Daubert* standards have been applied by federal courts in a number of environmental cases in the last few years. For the most part, the courts have applied a straightforward *Daubert* analysis. Some recent examples include:
A. Courts of Appeals

- **Dodge v. Cotter Corp.**, 328 F.3d 1212 (10th Cir. 2003) (Fourth appeal arising from cases seeking damages under CERCLA and tort claims based on contamination from a uranium mine; reversed district court’s rulings on admissibility of expert opinions because the “Findings lack the degree of specificity that would allow us to determine whether the district court properly applied the relevant law;” district court opinion contained no discussion of geologist’s conclusion that it was proper to use a general text for establishing baselines for metals where the area at issue was mineral rich and geologically varied.)

- **Stevenson v. E.I. DuPont DeNemours and Co.**, 327 F.2d 400 (5th Cir. 2003) (Claim by neighboring landowners that petrochemical plant contaminated their property and affected their health; challenge to air modeling expert and expert opinions on soil sampling; *Daubert* analysis involves challenge to admissibility of evidence; does not change court’s role in reviewing sufficiency of evidence which has been admitted.)

- **U.S. v. Dico, Inc.**, 266 F.3d 864 (8th Cir. 2001) (CERCLA case involving TCE contamination in groundwater; affirmed admission of hydrogeologist’s opinions despite defendant’s contention that expert ignored other sources of TCE and failed to consider other data, model was not basis for opinion on source of TCE, expert did consider other data and factual basis for expert opinion is an issue of credibility, not admissibility.)

- **NutraSweet Co. v. X-L Engineering Co.**, 227 F.3d 776, 787-790 (7th Cir. 2000) (Suit by property owner alleging that plaintiff’s property was contaminated by improper disposal of VOCs on the adjoining property; the court affirmed the district court’s conclusion that analysis of historical photographs is a well-accepted technique so as to bear a sufficient indicia of reliability; the photographic analysis was used by plaintiff’s environmental expert to confirm opinions based on solvent degradation (speciation), chemical chromatography and groundwater migration analysis which were not challenged on *Daubert* grounds.)

- **St. Martin v. Mobil Exploration & Producing US, Inc.**, 224 F.3d 402 (5th Cir. 2000), reh. denied, 234 F.3d 31 (5th Cir. 2000). (Action by property owners against oil companies for damage to marshes from alleged failure to maintain spoil banks on canals; ecology expert qualified to testify based on years of experience and personal observations; *Daubert* factors are nonexclusive and need not be rigidly applied in every case.)

- **Gussack Realty Co. v. Xerox Corp.**, 224 F.3d 85 (2d Cir. 2000) (Groundwater contamination case based on CERCLA and state torts; defendant offered opinion that involved property was upstream and
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upgradient; plaintiff offered expert opinion that groundwater flowed toward plaintiff’s property, in a different direction than surface water, based on review of defendant’s expert’s analysis and state agency data; admissibility affirmed – experts need not conduct their own tests, may rely on their interpretation of data collected by others.)

- **U.S. v. Cunningham,** 194 F.3d 1186 (11th Cir. 1999) (Criminal RCRA case in which the defendant was convicted of conspiracy and illegal transportation and disposal of hazardous waste; affirmed trial court’s exclusion of defense expert witness who based his opinion on an unproven test method, was unfamiliar with applicable regulations and disagreed with EPA’s regulatory determination that barium was a hazardous waste.)

- **Kalamazoo River Study Group v. Rockwell Int’l. Corp.,** 171 F.3d 1065 (6th Cir. 1999) (Two-site case where PCB’s released at one site were alleged to have traveled through a ditch and river to a second site; affirmed exclusion of expert opinion, where district court found that expert’s opinion was based on “speculation, conjecture and possibility” and that “the inadequate factual basis makes [the] affidavit scientifically unreliable”). See also district court opinion at 3 F. Supp. 2d 815 (W.D. Mich. 1997).

- **Burns Philip Food, Inc. v. Cavalea Continental Freight, Inc.,** 135 F.3d 526 (7th Cir. 1998) (Claim of contamination of land from diesel fuel on adjacent property; affirmed exclusion of environmental expert’s opinions which district court found to be based on inadequate investigation and testing).

B. District Courts

- **Seneca Meadows, Inc. v. ECI Liquidating, Inc.,** 121 F. Supp. 2d 248, 252-254 (W.D.N.Y. 2000) (Landfill case against generator defendants; court denied summary judgment where there were conflicting affidavits as to whether a defendant’s wastes were hazardous; the defendant did not challenge plaintiff’s expert’s methodology, but claimed factual errors underlying his analysis; the court found that the opinions were admissible and that the fact issues would be best addressed by cross-examination and presentation of contrary evidence at trial.)


admitted that she had no direct evidence of disposal of hazardous substances by dairy operator; district court held that opinions of a geologist and environmental engineer, both with substantial experience in remediation, concerning the likelihood of contamination from operation of a milk processing facility and absence of contamination from plaintiff’s operations was sufficient to preclude summary judgment.)

- **U.S. v. SCA Services of Indiana, Inc., 1995 WL 569634 (N.D. Ind. 1995)** (Waste disposal site; expert’s opinion excluded based on lack of foundation for conclusion that all products in the involved class contain the same hazardous constituents).

- **Thomas v. FAG Bearings Corp, 846 F. Supp. 1382 (W.D. Mo. 1994)** (A CERCLA case in which the defendant claimed that third party defendants contributed to TCE contamination in groundwater; court excluded expert opinions which it found to be “concocted of impermissible bootstrapping of speculation upon conjecture”; speculation that contamination entered groundwater and, if it did, that it traveled to involved area; “no information available to say with any degree of certainty that contaminants went from point ‘A’ to point ‘B’”).

While most federal environmental cases have applied a straightforward *Daubert* analysis, two cases contain language which suggests that a more liberal standard may apply to admissibility of expert opinions in environmental cases because of the remedial nature of the environmental laws. **B. F. Goodrich v. Betkowski, 99 F.3d 505 (2d Cir. 1996), cert. denied, 118 S. Ct. 2318 (1998),** a CERCLA case involving disposal at a landfill, has language which supports this approach. The court notes that: “[e]nvironmental science, like epidemiology ‘is ill suited to lead a fact finder toward definitive answers, dealing as it does in statistical probabilities.’” In effect, the court seems to say that environmental science, like epidemiology, is a “soft science” and that a more liberal analysis should apply to admissibility of expert opinions in these fields.

If this is what the court intended, it is not supported by *Daubert* and a majority of the cases decided under it. The Supreme Court’s decisions in *Daubert* and *Joiner* both involved epidemiology issues. Further, numerous circuit court and district court cases have applied a standard *Daubert* analysis to epidemiology issues. As the cases above demonstrate, most courts have also applied a standard *Daubert* analysis to environmental cases. A close review of the expert opinions and supporting bases in **B. F. Goodrich** suggests that it could have been decided the same way under a standard *Daubert* analysis. The court found that the expert’s opinions were supported by sufficient research, including EPA publications.
In *F. P. Woll & Co. v. Fifth & Mitchell Street Corp.*, 1999 U.S. Dist. LEXIS 874, 48 E.R.C. (BNA) 1362 (E.D. Pa. 1999), the district court followed *B. F. Goodrich* and used similar language concerning the application of *Daubert* in environmental cases.

9. **FREEPORT-MCMORAN/FOREST WASTE: A CASE STUDY**

*Freeport-McMoran, 56 F. Supp. 2d 823, supra,* is a recent example of the application of *Daubert* to proffered expert opinions in an environmental case. The court excluded the proposed expert testimony and granted summary judgment for defendants.\(^{18}\)

The case is a CERCLA contribution action involving a claim of transshipment of waste from one National Priority List (“NPL”) site (the Berlin & Farro site) to a second NPL site (the Forest Waste site). The plaintiff was a generator at the Forest Waste site which settled with EPA and agreed to participate in remediation of the Forest Waste site as a part of a group of Potentially Responsible Parties (PRPs). The defendants were generators who were alleged to have sent drummed waste to the Berlin & Farro site, a waste incineration facility. Defendants settled with EPA for contamination at the Berlin & Farro site.

Plaintiff claimed that some of the drummed waste which defendants sent to the Berlin & Farro site was not incinerated there but, instead, was transshipped to the Forest Waste site. EPA and the PRP group at Forest Waste decided not to bring claims against the Berlin & Farro generators relating to the Forest Waste site.

The plaintiff had no evidence that any of defendant’s drummed wastes were disposed of at the Forest Waste site. Instead, plaintiff attempted to prove indirectly that defendants’ drummed waste was transshipped from the Berlin & Farro site to the Forest Waste site for disposal.

Plaintiff’s theory was as follows:

1. Each defendant arranged for the disposal of drummed waste at the Berlin & Farro site;
2. Each defendant’s drummed waste that arrived at the Berlin & Farro site contained solid materials;
3. After the liquids were drained or pumped from each defendant’s drums at Berlin & Farro, residual solids remained;

\(^{18}\)D.G. Ries, one of the authors of these materials, argued the *Daubert* motion for a defense group of 12 defendants.
4. Each defendant’s drums containing residual solids were transshipped from Berlin & Farro to the Forest Waste site.

5. The residual solids remaining in each defendant’s drums which were transshipped to the Forest Waste site contained hazardous substances like those present at the Forest Waste site.

Plaintiff originally retained the expert to review each defendant’s waste stream to express opinions as to CERCLA hazardous substances which they contained. In order to develop plaintiff’s transshipment theory, plaintiff later requested the expert to provide an opinion as to the presence of a solid component in each defendant’s waste.

Plaintiff’s expert had a Ph.D. in chemistry, taught at a small college for several years, and then worked at EPA in the fields of CERCLA and RCRA for several years. He then became a litigation consultant and served as an expert witness in over 183 cases, primarily for the federal government.

The expert studied the available materials about each defendant’s waste streams and expressed opinions which were essentially carbon copies as to each of the defendants:

1. That each defendant’s waste contained some solids;
2. That the solids would settle by gravity, to the bottom of the drums in which they were stored;
3. That some residual solids would remain in the drums when the overlying liquids were poured or decanted at Berlin & Farro; and
4. That the residual solids contained hazardous substances of the type found at the Forest Waste Site.

The evidence established that every effort was made to completely drain the drums at Berlin & Farro by pouring out their contents or pumping them out. Only drums which still contained too much solid material after this process for the drums to be recycled were disposed of onsite or at one of several landfills. Most drums were sold to drum recyclers.

There was no evidence that any defendant’s drums contained too much solid material for the drums to be recycled. The expert did not express any opinions on quantities of solid materials in any defendant’s drums.

What was missing from the expert’s analysis, *inter alia*, was any fact evidence or opinion that drums which contained some unspecified quantities of residual solids would be transshipped to Forest Waste, rather than being recycled.

After the close of discovery, including a two-day deposition of plaintiff’s expert, defendants filed a motion to strike the expert opinions, along with motions for summary judgment. The district court granted these motions. In excluding the proffered expert opinions, the court found:

- The proposed opinions were “utterly lacking in any indicia that would establish any of the *Daubert* factors”;}
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• The only source for substantiation of the expert’s theories was his “own experience”; and
• The opinions were unreliable because they were based on a misunderstanding of the facts.
56 F. Supp. 2d at 832-837.

The expert’s opinions might have been scientifically reliable and admissible if he had limited his analysis to his original task—comparing the hazardous substances found in each defendant’s waste streams to the hazardous substances found at the site. However, he went well beyond this task. He attempted to express carbon-copy opinions as to the solids in each defendant’s wastes, based on limited information, which varied as to each defendant, with no observation or testing of the wastes and without an adequate scientific or factual basis. When asked if there was a set of information about each defendant’s wastes which he sought in order to perform his analysis, he responded that there was not and that he relied on the information which plaintiff’s counsel elected to give him. When asked if there are any published or generally accepted standards for his analysis, he stated that there may be, but he could not point to them and did not refer to them.

10. CONSIDERATIONS FOR ENVIRONMENTAL PROFESSIONALS

As noted in the Introduction, it is important for environmental professionals who may testify in litigation to understand the general principles of admissibility of expert opinions. While offering and challenging expert opinions is primarily the responsibility of attorneys, environmental consultants often get involved before attorneys in matters that may later result in litigation. In such cases, they can provide the foundation for litigation through documented, scientifically reliable work in accordance with the litigation standards discussed above. Providing such a foundation is often an issue of documentation as well as the nature and methodologies of the services. Generally accepted standards and methodologies and generally accepted treatises and reference materials should be employed and their use should be documented. Litigation may require more rigorous and more detailed analysis than general environmental protection services. Each task must be analyzed in light of how it will fit into a courtroom presentation. It is particularly important that subcontractors and other service providers, like labs, know that a matter may be headed for litigation and that special attention is addressed to predicates for admissibility, particularly, documentation and personal observation or supervision by qualified
individuals. Qualifications of persons performing each task should be reviewed to be sure that they will be sufficient for litigation, especially if they could be called to testify on behalf of a client. This is particularly important for professionals who exercise their own professional judgment and reach their own expert opinions rather than simply performing support functions such as data collection.

Once a matter reaches litigation, environmental professionals who are familiar with these principles can provide significant assistance to attorneys in offering and challenging expert opinions. In situations where environmental consultants are retained for litigation, they should follow the same standards and methodologies normally used for their work, with even more rigorous analysis, if appropriate.

11. CONCLUSION

In federal courts, admissibility of expert opinions is now governed by Fed. R. Evid. 702 which requires that the expert opinion must be based on (1) sufficient facts and data, (2) reliable principles and methods, and (3) reliably applied principles and methodology. Reliability is measured by a flexible analysis described in Daubert and the subsequent cases applying Daubert. This analysis serves both to exclude “junk science” and unreliable opinions and to permit admission of reliable opinions which have not yet reached general acceptance. Expert opinions must also be relevant to the issues in dispute. Similar considerations apply in state courts which have adopted Daubert.

In states which continue to apply the Frye analysis, admissibility of expert opinions requires general acceptance of the expert’s principles and methodology in the relevant scientific community. Some courts also require general acceptance of the conclusions as well as the methodology. Finally, some jurisdictions apply the Frye test to all expert opinions while others limit its application to novel scientific evidence.

REFERENCES

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