Winter 1985

Strategic and Scientific Considerations in Toxic Tort Defense

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STRATEGIC AND SCIENTIFIC CONSIDERATIONS IN TOXIC TORT DEFENSE

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I. PREFACE

The past decade has seen a dramatic increase in suits for injuries resulting from exposure to toxic substances.\(^1\) Since these suits commonly involve multiple defendants, highly technical scientific testimony, unusual legal theories, and many years of alleged exposure, they present a novel form of complex litigation and pose sophisticated problems in many phases of trial preparation.\(^2\) As toxic tort litigation continues to proliferate, an increasing number of practitioners will face the prospect of defending these actions.

This article centers on pretrial considerations, and is intended as an orientation for the practitioner who must defend toxic tort cases without substantial experience in complex injury litigation.\(^3\) Common problems encountered in trial preparation will be examined, and proposals for defensive cooperation will be reviewed. Discovery strategies will be suggested, and common motions will also be discussed and evaluated. Regarding each pretrial issue, practical considerations of cost control and administrative efficiency will be addressed. With these techniques, meritorious claims may be expeditiously identified, and defensible cases may be economically tried. While such goals are common to the defense of all litigation, they are especially crucial in toxic tort cases, where isolated and traditional defense practices may create dangerous strategic obstacles.

II. THE JOINT DEFENSE OPTION

Due to the complexity of toxic tort litigation, counsel's primary goal should be an organized, informed, and expeditious response. Plaintiffs commonly sue multiple defendants, generating an atmosphere

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1. Regarding asbestos alone, over 16,000 cases were pending in 1982, and additional cases were being filed at the rate of over 450 each month. Wall St. J., June 14, 1982, at 1, col. 6. Over 30,000 new asbestos actions are anticipated within the next 25 years. Olick, Chapter 11—A Dubious Solution to Massive Toxic Tort Liability, 18 FORUM 361 (1983). As Haskell Shelton has stated: “Even without a crystal ball, it is easy to see a wave of cancer litigation on the horizon.” Shelton, Defending Cancer Litigation, FOR THE DEFENSE, January 1982, at 14. See generally Black & Lilienfield, Epidemiologic Proof in Toxic Tort Litigation, 52 FORDHAM L. REV. 732, 733 (1984); Grant, Establishing Causation in Chemical Exposure Cases, The Precursor Symptoms Theory, 35 Rutgers L. REV. 163, 164 (1982) (both discussing proliferation of toxic tort litigation).

2. This complexity, coupled with the extraordinary expense attendant to defending these cases, may motivate defendants to settle unmeritorious claims. See Sheridan, Rethinking Mass Tort Defense, 9 LITIGATION, (Summer 1983), at 29-30.

3. This article does not address the special problems inherent in class actions, which are generally disfavored in product liability litigation. See In re Federal Skywalk Cases, 680 F.2d 1175 (8th Cir. 1982), cert. denied, 459 U.S. 988 (1983); In re Northern Dist. of Cal. Dalkon Shield IUD Prod. Liab. Litig., 693 F.2d 847, 855 (9th Cir. 1982); cert denied, 459 U.S. 1171 (1983); McElhaney v. Eli Lilly & Co., 93 F.R.D. 875 (D.D.C. 1982); Ryan v. Eli Lilly & Co., 84 F.R.D. 230 (D.S.C. 1979); Mink v. University of Chicago, 27 Fed. R. Serv. 2d 739 (N.D. Ill. 1979). But see In re Three Mile Island Litig., 87 F. R.D. 433 (M.D. Pa. 1980); Payton v. Abbott Labs, 83 F.R.D. 382 (1979), vacated, 100 F.R.D. 336 (D. Mass. 1979). Problems of complex litigation management in the federal courts, such as multi-district litigation, are also not discussed. Given state venue problems and frequent lack of diversity of citizenship, federal forums and procedures are often unavailable. Hence, this article emphasizes the more common claim, where individuals sue multiple defendants in a state court.

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of confusion. Lack of cooperation among defendants often results in cross-actions and uncoordinated discovery. This antagonism may actually aid the plaintiff’s case. Nominal settlements by some defendants may enable a plaintiff to finance a case which he could not otherwise afford. This scenario, however, is not inevitable. Creative joint defense efforts may reduce confusion, provide strategic opportunities, and greatly reduce litigation costs. There is a distinct industry trend towards a shared counsel concept. Properly utilized, shared counsel can yield surprising strategic and cost saving results.

A. Joint Defense Forms

Joint defense efforts take two basic forms. The first involves retention of a single outside counsel to represent all named defendants. This group counsel decision is normally made at the outset of the litigation, before answers are filed. After counsel is retained, a “defense committee” of house attorneys is selected to direct the litigation and act as a liaison for information. Defendants share defense costs, but reserve the right to seek contribution or indemnity from each other at a later time.

The second joint defense form involves the appointment of several defense committees to coordinate discovery and interaction among several outside counsel. This form is appropriate when separate trial counsel are preferred by defendants with special interests. The liaison relationship is established and used in the same manner as discussed above. These defense cells can still promote cost-efficient cooperation.

Significantly, joint defense efforts need not continue throughout the course of the action. A company may choose to participate only in neutral discovery areas, such as development of the plaintiff’s medical and employment information, exploration of scientific data, and evaluation of the exposure area. The extent of participation can be negotiated; even limited involvement should promote efficiency.

Whichever form of joint defense is chosen, the success of the venture depends upon aggressive and cooperative defense committees. Commonly, defense committees will coordinate projects by delegating tasks to specific defendants. These might include discovery or research on issues of common interest. The committees may also poll parties regarding tactical decisions and cost-allocation and may serve as an information source regarding litigation status. In this manner, unnecessary or repetitive communications with outside counsel can be reduced.

Contrary to other forms of litigation, which often can be managed by house counsel without litigation experience, these cases merit management by experienced attorneys. To the extent available, house counsel should remain actively involved throughout the litigation and be prepared to assume first-chair responsibility if problems necessitate withdrawal. House counsel can also reduce outside counsel fees by performing

4 See, e.g., Wagner v. Allied Chem. Corp., No. JH-84-59 (D. Md. filed Jan. 1984) (24 plaintiffs suing 18 corporate defendants for injuries from exposure to “chemicals”). According to plaintiffs, their injuries are the results of “diseases” which “include, but are not limited to, oncological, neurological, behavioral, mental, respiratory, pulmonary, cardiac, cardiovascular, thyroid, hepatic, renal, reproductive, mutagenetic, teratological, dermatological, gastrointestinal, and optical” conditions. See also Complaint for Plaintiff at 3, Acosta v. Allied Chem. Corp., No. L-18839-81 (N.J. Super. Ct. Law Div., Hudson County, filed Dec. 1981) (400 plaintiffs suing 27 corporate defendants for injuries sustained from exposure to various chemicals in their employment.) Even when single plaintiffs are involved, multiple defendants are common. See, e.g., Peterson v. Shell Oil Co., No. 82-60428 (Dist. Ct. of Harris County, 81st Judicial Dist. of Texas, Dec. 1982) (18 corporate defendants).

5 See Sheridan, supra note 2.

customized work in-house. Legal research is a prime example of such a customized function. Other examples include coordination of document production, preparation of witnesses for depositions and trial, and preparation of pretrial orders.

The drawbacks of joint defense arrangements have been exaggerated. One of the most common concerns is whether the attorney-client privilege is forfeited when privileged information is shared with other group members. This problem has been addressed in the antitrust arena, however, where courts have recognized a "joint defense" exception to the general rule that communications made in the presence of third parties are unprivileged. Under this exception, an attorney's disclosure of privileged information to actual or potential co-defendants in the course of a joint defense does not waive the attorney-client privilege. So long as the defendants have shared confidential information for the limited purpose of facilitating their defense, such matters remain immune from the plaintiff's discovery. Of course, matters disclosed during a joint defense are not privileged among the participating defendants, and for this reason, some sensitive information should be monitored carefully. For example, if the plaintiff asserts a market-share form of liability, disclosure of marketing information may prejudice the company in later actions for contribution or indemnity. If such arguments are urged, the company should consider withdrawing from the group.

Another drawback of the joint defense concerns potential conflicts of interest. Even if all parties waive conflict arguments at the outset, later developments may require reconsideration. This is particularly true if members raise issues of contribution or indemnity, or if facts support imposition of punitive damages.

7 See, e.g., Wilson P. Abraham Constr. Corp. v. Armco Steel Corp., 559 F.2d 250, 253 (5th Cir. 1977); Hunydee v. United States, 355 F.2d 183, 185 (9th Cir. 1965); Continental Oil Co. v. United States, 330 F.2d 347 (9th Cir. 1964); In re LTV Sec. Litig., 89 F.R.D. 595, 604 (N.D. Tex. 1981); In re Grand Jury Subpoena Ducas Tecum Dated Nov. 16, 1984, 406 F. Supp. 381, 386 (S.D. N.Y. 1975) (The privilege attaches whether the disclosure is made by house counsel or outside counsel). See Upjohn Co. v. United States, 449 U.S. 383 (1981) (holding that house and outside counsel communications are protected by the attorney-client privilege when they are acting as attorneys).

8 See, e.g., Abraham Constr. Corp., 559 F.2d at 253 (parties must not have exchanged information "for the purpose of allowing unlimited publication and use, but rather . . . for the limited purpose of assisting in their common cause."); cf. Hunydee, 355 F.2d at 185 (Joint defense privilege protects communications "to the extent that they concern common issues and are intended to facilitate representations in possible subsequent proceedings.").

9 As the court stated in In re Grand Jury Subpoena Ducas Tecum:
To be sure, what is divulged by and to the clients present at such a meeting cannot be deemed to be confidential inters esse: in any later controversy between or among those clients, the privilege could not stand as a bar to full disclosure at the instance of any of them... Nonetheless, in the absence of such event and in relation to the rest of the world, the attorney-client communications issuing from such a joint conference are invested within absolute secrecy.

406 F. Supp. at 386.


11 See Sheridan, supra note 2, at 32; see generally Moore, Conflicts of Interest in the Simultaneous Representation of Multiple Clients: A Proposed Solution to the Current Confusion and Controversy, 61 Tex. L. Rev. 211 (1982).
against selected defendants, rather than the group. Each of these problems may justify withdrawal. House counsel must monitor the action carefully in order to deal with these problems effectively.

B. Joint Defense Procedures

Certain standard procedures and agreements are needed for a joint defense effort. Immediately upon receipt of service of process, house counsel must contact house attorneys for other defendants. Early communication between house counsel minimizes the chance of outside counsel involvement before a joint defense can be negotiated. This communication can be established through telex. The telex should invite other counsel to share in a joint defense. The suggested outside counsel must be identified before the invitation is extended, and his identity should be disclosed in the telex. Assertiveness in this area will minimize disputes among defendants on this delicate issue. A telephone conference call may be set for discussion of the telexed proposal.  

At the telephone conference, counsel should secure consent to the joint defense from as many co-defendants as possible. If a single outside attorney is not in the best interests of a particular group, the alternative "cell" arrangement should be explored. If counsel agree on a form of joint defense, the following agreements should also be concluded:

1. To divide fees of outside counsel;
2. Not to settle without advising co-defendants of the decision;
3. To permit withdrawal from the joint defense effort if a conflict of interest develops;
4. To forbear cross-actions;
5. Not to oppose the dismissal of the action against a particular co-defendant;
6. Not to use the same outside counsel in any subsequent action for contribution or indemnity against a co-defendant;
7. To appoint certain counsel to serve on the defense committee.

The house counsel who propose the arrangement should confirm these agreements by letter before retaining outside counsel. If the parties desire, a more formal sharing agreement may be used. However, the press of litigation schedules often precludes negotiation of such a detailed arrangement.

After a joint defense agreement is concluded, the organizing house counsel should retain outside counsel for the group. The retention should be accomplished by a formal engagement letter. The following terms should be included in the letter:

1. Identities of all companies included in the joint defense arrangement;
2. Identities of the contact persons for each company;
3. Identities of the persons on the defense committee, if such a committee exists;
4. Insurance information, if relevant;

See Appendix for a telex form.
See Appendix for a confirming letter form.
See Sheridan, Sindell and Its Sequelae, supra note 6, at 1133, for a sharing agreement form. Sheridan's "sharing" concept not only allocates costs, but judgement shares. For this reason, negotiations may prove extremely difficult.
See Appendix for an engagement letter form.

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(5) Fee agreements and billing instructions;
(6) Specialized litigation policies arising from the joint defense effort, such as settlement, regular written status reports, conflicts of interest, choice of experts, and discovery; and
(7) Copies of pertinent joint defense agreements, including the initial telex and confirming letter.

Since arranging the joint defense may consume much of the time allotted for answering the action, house counsel may need to secure an answer date extention from the court or plaintiff's counsel. Once outside counsel is retained, the defense effort can proceed in a relatively traditional fashion. Throughout this action, house counsel should be fully informed. In particular, he should personally review all communications with outside counsel and other group participants to monitor potential conflicts of interest.

Despite its novel problems, the joint defense effort appears to be an extremely effective tool in the defense and management of complex tort litigation. Discovery can be streamlined, and most facts can be developed before considerations of confidentiality or conflicts need be addressed. With cooperation, trial preparation can be expedited, and costly courtroom time can be reduced.

### III. DISCOVERY

Although discovery in toxic substance litigation generally involves the same methods used in other actions, expanded and innovative uses of these devices are often required. The mass of information needed to develop these actions may encompass years of scientific study and thousands of documents generated by each defendant. Commonly, toxic tort cases involve several defendants, and if a joint defense arrangement is not concluded, uncoordinated discovery may result in paper proliferation. These piles of duplicitous data present genuine obstacles to case evaluation and trial preparation.

All defense counsel should, if possible, agree upon a coordinated approach to discovery. This should be accomplished at a conference held soon after all parties have answered the action. At that conference, certain discovery responsibilities may be delegated in neutral areas, such as product identification, the plaintiff's personal and medical background, applicable medical records, and employment information. These responsibilities may be discharged by one or two counsel and the resulting information shared among the group. Ideally, these matters should be concluded before "adversarial" discovery commences, when each defendant's individual interests may dictate different strategies.

#### A. Neutral Discovery

**I. Product Identification**

As a general rule, the first objective of discovery in a toxic tort action should concern product identification. An early determination regarding the involvement of each defendant's product is essential. If the presence of a particular defendant's product cannot be confirmed, the defendant may be voluntarily dismissed from the suit, or alternatively, obtain summary judgment.\(^\text{16}\)

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At this early stage, the employer is often the focal point for case evaluation. Since most manufacturers have little knowledge of the customers serviced by their distributors, it is extremely difficult to trace the line of distribution from the manufacturer to the employer. If the search begins with the employer's records, however, the presence of a particular manufacturer's product can be readily confirmed. Although it might seem that this procedure aids the plaintiff in identifying potentially culpable defendants, this criticism does not justify failing to pursue product identification discovery. Without such information, a nonculpable defendant may remain in the case indefinitely, incurring extraordinary legal expenses even though the plaintiff was not exposed to its product. On the other hand, if the involvement of a particular defendant's product is confirmed, risk may be assessed more realistically. Thus, since both plaintiff's and defendant's interests are served by early product identification discovery, there is no justification for remaining ignorant of these matters.

In some jurisdictions, it may be prudent to consider joining the employer as a third-party defendant for contribution, particularly if the employer's conduct in the matter reflects intentional disregard of the employee's safety. Actions for common-law indemnity may be allowed where the employer is primarily responsible, or where a special relationship justifies implication of an indemnity obligation. Even in states which preclude such actions, statutes may permit indemnity pursuant to a written agreement with the employer's workers' compensation bar where employer fraudulently concealed evidence of disease.


In this light, it is appropriate to explore the relationships between the employer and the various defendants, and possibly treat the employer as an adverse party in depositions and trial.

2. Injury Evaluation

As in any personal injury case, a thorough evaluation of the plaintiff’s injuries is essential to an informed defense. Since all defendants share a common interest in this evaluation, it is an ideal subject for cooperation. The most effective formal discovery devices in this area are written interrogatories. They should be used to develop information regarding the plaintiff’s personal and work history, the location and extent of exposure, the particular substances to which the plaintiff was exposed, witnesses (including experts), identities of treating physicians, medical expenses, and other areas of common interest. Usually, only one set of interrogatories is necessary. At this point, detailed inquiries regarding specific products should be omitted. This information may be developed later by counsel for each defendant.

Another neutral discovery area concerns social security information. When a plaintiff alleges a cumulative exposure over many years, it is usually important to identify each location where exposure may have occurred. Depending on a plaintiff’s memory for this information, it is, at best, a risk. To avoid this problem, counsel may contact the Social Security Administration to obtain plaintiff’s life employment history. Under normal circumstances, authorization can be obtained from a plaintiff directly, but if the plaintiff refuses to cooperate, a court order may be necessary.

Other areas of common interest concern documentation needed from the plaintiff’s treating physicians and employers. A plaintiff will usually furnish a medical authorization permitting informal discovery of medical documentation. If this cooperation is refused, however, the documents may be obtained through a deposition on written questions, accompanied by a subpoena duces tecum. Employment records may also be obtained through the deposition and subpoena procedure.

The final neutral discovery area concerns court ordered mental and physical examinations. At some point after medical data has been produced and examined, the defendants will probably request such an evaluation. In cases involving multiple defendants, the plaintiff will probably object to repetitive examinations by each defendant’s chosen physician. Thus, counsel should, to the extent possible, agree upon a common physician to conduct exams and share the data generated by the physician.

B. Internal Discovery

While the neutral discovery process is proceeding, counsel should seek internal information from their respective clients. Early pursuit of this data will aid in liability evaluation and will facilitate response to later discovery requests. Counsel should avoid being placed in the position of learning the facts through the plaintiff’s discovery.

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21 See CAL. LAB. CODE § 3864 (West 1971); N.C. GEN. STAT. § 97-10.2(c) (Supp. 1983); PA. STAT. ANN. tit. 77, § 481(b) (Purdon Supp. 1983); TEX. REV. CIV. STAT. ANN. art. 8306, § 3 (Vernon 1967). However, at least two states have held similar statutes unconstitutional. See Sunspan Eng’g & Constr. Co. v. Spring-Lock Scaffolding Co., 310 So. 2d 4 (Fla. 1975); Carlson v. Smogard, 298 Minn. 362, 215 N.W.2d 615 (1974) (both holding that arbitrary elimination or limitation of indemnity rights violates due process). The Texas Supreme Court recently held that an employer’s fault cannot be considered to apportion damages in a suit by its employee against a third party. See Varela v. American Petrofina Co., 658 S.W.2d 561 (Tex. 1983). Significantly, however, no constitutional issues were raised in Varela.

22 These records should be obtained at the earlier product identification stage.

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After reviewing the complaint to ascertain the types of substances involved, the dates of exposure, and the geographic area where exposure occurred, the client should be advised of this information and certain data requested. This data includes: (1) Material Safety Data Sheets, Material Safety Data Sheets (MSDS) may be furnished by manufacturers to their customers. They include information regarding health hazards, threshold exposure limitations, ventilation precautions, and suggested safety equipment.

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material safety data sheets for the products involved; (2) labels and labeling information; and (3) identities of distributors of the product. The request should be limited to the pertinent periods of exposure and the geographic areas where the alleged exposure occurred.

To the extent possible, counsel should avoid a case-by-case approach to developing the client’s defensive data. To avoid duplication of efforts, counsel should request information regarding prior or pending cases involving the client’s products and should consult with counsel in those actions regarding information developed in discovery or trial. Without such information, the same or similar facts may be developed many times. House counsel may take a major role in coordinating basic information for outside counsel by collecting and maintaining independent files regarding commonly requested information. In addition to records of prior claims, these files may include data regarding the company’s research and development activities, governmental or industrial standards, and trade association memberships.

Finally, counsel should make an early effort to meet with the client’s internal toxicological staff, or alternatively, an independent toxicological consultant. Usually, such a meeting should occur after the toxicologist has reviewed the plaintiff’s medical records, but before adversarial discovery begins. From the records, the toxicologist may be able to evaluate the plaintiff’s symptoms and determine whether the injuries may have resulted from toxic exposure. If counsel is not already familiar with the basic scientific literature on the particular product and its toxic effects, a bibliography may be furnished and selected reading suggested.

C. Adversarial Discovery

To this point, we have considered neutral and internal discovery procedures which can be accomplished without reducing cooperation among defendants. After such matters are concluded, however, the situation becomes more adversarial. The defendants must now discover the extent of the plaintiff’s exposure to their particular product and begin the complicated process of collecting facts unique to their defenses.

1. Interrogatories

This process usually begins with each defendant serving customized interrogatories on the plaintiff. In general, the interrogatories request information regarding the product attributed to each defendant, the use made of the particular product, the work environment in which the product was used, periods of exposure, container and labeling information, and knowledge of risks concerning the product. Each defendant may also request documents related to the information generated by these interrogatories. When this written discovery is completed, the deposition process may begin.

2. Lay Depositions
Depositions generally serve the same purposes in toxic substance litigation as they do in other actions. There are, however, certain unique issues that need to be addressed when deposing toxic substance witnesses. When a cumulative injury is alleged, it is important to explore the nature and extent of exposure, as well as symptoms and treatment of the resulting disease. This may develop defenses, such as limitations, which depend on the plaintiff's knowledge of injury. The plaintiff's use of tobacco, alcohol, or drugs may have contributed to the injury, and this information may prove valuable in mitigating or eliminating liability.

Plaintiff's knowledge of risks inherent in product use is usually crucial to the defense effort. Commonly, the central allegation concerns the lack of an adequate warning. In recent years, product information has proliferated beyond mere labels and technical bulletins. Employers, as well as unions and other trade organizations, often furnish detailed safety and health information to employees. The plaintiff's knowledge of this information may justify a defense based upon contributory fault. If information was not available or accessible, the employer might be joined for contribution.

Individuals may be exposed to toxic substances in several ways, and different plaintiff categories present specialized problems. Typically, the primary action alleges exposure before sale in the formulating process or after sale upon product usage. In a workplace exposure, the worker may have a worker's compensation file, which may contain valuable information. The work environment must be examined and the employer's safety procedures explored. Co-workers may be deposed, particularly those with designated safety responsibilities. Workplace conversations are a common means of communicating product dangers. Despite a possible predisposition towards the plaintiff, safety representatives may be reluctant to admit that they failed to communicate risks properly.

In consumer actions, where the plaintiff alleges exposure during use of the end product, the plaintiff's sole warning may be the product label. Here, the examination must concentrate on the communication and comprehension of the warning. Although whether the label was read is important, whether it was understood is equally crucial. In some circumstances, a plaintiff may have knowledge from sources other than the label. Such sources should be identified and explored.

Claims asserted by spouses and family members, as well as those advanced by casually exposed community members, present extreme difficulties. Aside from the usual loss of consortium claims, family members may have independent claims based upon nonoccupational exposure. A worker may, for example, carry toxic materials into his home on his clothing, thus exposing family members directly. Persons exposed in such a fashion obviously receive no formal warnings or safety information and learn of the dangers solely through hearsay, if at all.

Community members are an even more remote group of plaintiffs. Typically, they include persons living in the manufacturing area who allege exposure by atmospheric discharge or groundwater pollution. In this area, plaintiffs often have absolutely no information regarding the precise exposure circumstances, and symptoms may be extraordinarily varied and widespread. Here, more than any other situation, the focus must shift to scientific investigation and medical testimony. If more than one defendant is involved, identifying the responsible party may be difficult. Accordingly, it is extremely important that the plaintiff be forced to identify the precise substance connected with the disease or injury. If such an identification cannot be made, or if the plaintiff cannot establish a positive causal connection between the designated product and the injury, the action should be challenged by motion for summary judgment.
3. **Document Production**

Perhaps the most difficult and dangerous problems associated with the defense of toxic substance actions concern document organization and production. When a manufacturer is involved, several corporate departments must be consulted, and thousands of documents must be reviewed and organized. These typically include marketing and accounting data, toxicological materials, safety and environmental records, and in the case of regulated chemicals, such as pesticides, voluminous governmental correspondence and reports. In a cumulative injury case, retrieval presents an immense problem.

When a defendant is involved in many suits regarding similar substances, uncoordinated productions may be inaccurate or incomplete. These errors may hauntingly return in later cases. This danger places increased responsibility upon counsel. Trial counsel must have knowledge of document responses in prior litigation, even if the client was represented by another attorney in the earlier case. To achieve this essential coordination, the client should maintain records of prior productions and should make these available for review. A case-by-case approach to toxic substance litigation is not only inefficient, but dangerous; if the client does not maintain records of prior productions, or chooses not to share this information, the client should be fully advised of the risks associated with these practices.

One of the most difficult problems associated with document production concerns the timing of the request. Commonly, a massive request for production is the first discovery initiated by the plaintiff. Such a request may be served before the issues of product identification and injury evaluation can be resolved. If such an ill-timed production is allowed to proceed, a nonculpable defendant may be forced to spend substantial time and money unnecessarily. Not surprisingly, such defendants may choose to settle with the plaintiff for the cost of production, resulting in an unjust windfall.

The most effective procedure for challenging untimely document requests is to seek protective orders from the court. Both federal and state rules generally allow a party to preclude, modify, or delay his opponent's discovery upon a showing of "undue burden and expense." Given the extraordinary expense

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24 Document production may be the most abused discovery device: Each side has the ability to use a request for production as a means of imposing a burden on the other. The requesting party can force a discoveree to review an enormous mass of material and, in return, the discoveree will feel no pressure to restrict actual production to only materials that are truly relevant and material. Staff Paper on Scope of Discovery, Papers from Staff Presentation to the National Commission for the Review of Antitrust Laws and Procedures, 36-36A (1978). See generally Erickson, The Pound Conference Recommendations: A Blueprint for the Justice System in the Twenty-First Century, 76 F.R.D. 277 (1978).


26 FED. R. CIV. P. 26(b)(1) and 26(c), which provide for such orders "for good cause shown" to protect a party from "annoyance, embarrassment, oppression, or undue burden and expense." Similarly, TEX. R. CIV. P. 166(4) permits protective orders when needed to avoid undue burden, unnecessary expense, harassment or annoyance, or invasion of personal, constitutional or property rights." Excessive discovery poses severe problems in judicial administration. As the Federal Rules Advisory Committee has stated: "Given our adversary tradition and the current discovery rules, it is not surprising that there are many opportunities, if not incentives, for attorneys to engage in discovery that, although authorized by the broad permissive terms of the rules, nevertheless results in delay." FED. R. CIV. P. 26, Advisory Committee Note; see also Brazil, The Adversary Character of Civil Discovery: A Critique and Proposals for Change, 31 VAND. L. REV. 1295 (1978); Schroeder v. Frank, The Proposed Changes in the Discovery Rules, 1978 ARIZ. ST. L.J. 475 (1978).
necessary for corporate document production,\textsuperscript{27} it is reasonable that a general document production should be deferred until \textit{after} product identification and injury evaluation discovery are concluded. At the conclusion of discovery regarding these issues, broad document production should be permitted only upon a showing that there is a reasonable basis for the plaintiff's claims against each targeted defendant.

This procedure was approved in \textit{Isaac v. Shell Oil Co.}\textsuperscript{28} In \textit{Isaac}, the plaintiff claimed that he contracted cancer while repairing electroplating machinery. He sued the manufacturers of the chemicals involved in the electroplating process. Early in the litigation, the plaintiff served a broad subpoena duces tecum on the equipment's owner, requesting information relating to all chemicals and/or substances used in the electroplating process and all purchase, lease, and repair documents regarding the machinery. The owner moved to quash the subpoena, asserting that such a broad discovery request was excessively burdensome and expensive, especially since it was directed against a nonparty. The plaintiff then sued the owner directly, who responded with a formal motion for protective order. In support of its motion, the owner filed affidavits substantiating the costs associated with the production. In granting the motion, the court ruled that under the record, the plaintiff had a threshold burden to show a reasonable basis for the owner's liability before obtaining extensive documentation. As the court stated: "Where a plaintiff has shown not even reasonable grounds to support his allegations of liability, and where the discovery costs faced by the defendant are substantial, justice requires that a protective order be granted."\textsuperscript{29}

The \textit{Isaac} court analogized its holding to a major United States Supreme Court decision regarding class actions. In \textit{Oppenheimer Fund, Inc. v. Sanders},\textsuperscript{30} the Supreme Court held that a class action defendant should not be responsible for the costs of determining the members of the plaintiff's class. In that decision, the Court noted that mere allegations of wrongdoing are insufficient to require a defendant to "undertake financial burdens and risks to further a plaintiff's case."\textsuperscript{31} Significantly, the \textit{Oppenheimer} Court held that the defendant's ability to pay the costs was irrelevant.\textsuperscript{32}

\textit{Isaac} and \textit{Oppenheimer} recognize the court's inherent power to preclude untimely or unjustified discovery, particularly when the production is shown to be potentially unnecessary or unduly expensive.\textsuperscript{33}
Such restrictions are within the spirit of the rules. 34 Unless a plaintiff can show he was exposed to a particular defendant's product, he should not be allowed to forage through the defendant's corporate records. Likewise, if a plaintiff cannot demonstrate a causal connection between the product and his injury, a general document production should be denied. Restricting document production to these specific issues allows discovery to progress reasonably without the extreme burden and expense attendant to broad document production. 35

4. Expert Witnesses and Consultants

The issues raised in toxic tort litigation bridge many areas of expertise. Of course, medical expertise is primarily important; however, several other disciplines are also relevant. As a general rule, medical expert witnesses should be chosen by the same criteria used in other injury actions. The nature of the injury will control the type of physician chosen. Often, a single physician can conduct the plaintiff's physical examination and testify regarding the general effects of each defendant's products. If such an arrangement is not possible because of a wide variety of products, defendants should still limit experts by grouping products into categories and retaining single witnesses to testify about the products in each category. Aside from the standard medical expert, a number of other persons may be useful as consultants or, if necessary, expert witnesses. These include industrial hygienists, epidemiologists, and toxicologists.

*Industrial hygienists* specialize in analyzing exposures to toxic substances in the workplace. Typically, manufacturers have staff industrial hygienists who participate in evaluating and promulgating standards for product safety, use, and labeling. An independent industrial hygienist may be retained to evaluate the exposure characteristics of a plaintiff's place of employment, or to consider the efficacy of the employer's industrial hygiene program. In cases where product inhalation is involved, industrial hygienists may conduct air dispersion studies, either alone or teamed with an air dispersion specialist.

*Epidemiologists* analyze the incidence of population health problems. Generally, their medical expertise is combined with intensive studies in statistics and public health. Epidemiologists are useful in evaluating the significance and reliability of reports and studies of industrial disease incidence. Since plaintiffs commonly attempt to interpolate data from laboratory animals to humans, epidemiological studies of human cohorts are becoming increasingly important. 36 Epidemiologists may work closely with nonmedical statistical experts, such as biostatisticians.

*Toxicologists* evaluate the effect of toxic substances on human systems. Toxicologists generally have intensive training in the diagnosis of chemical injuries or disease. They may be consulted to analyze whether

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34 As the Federal Rules Advisory Committee has stated:

The purpose of discovery is to provide a mechanism for making relevant information available to the litigants. Thus the spirit of the rules is violated when advocates attempt to use discovery tools as tactical weapons rather than expose the facts and illuminate the issues by overuse of discovery or unnecessary use of defensive weapons or evasive response. All of this results in excessively costly and time-consuming activities that are disproportionate to the nature of the case, the amount involved, or the issues or values at stake. **FED. R. CIV. P. 26, Advisory Committee Note to 1983 Amendment (citations omitted).** Indeed, the 1983 amendments to Rule 26 are intended to encourage judges to act more aggressively in curtailing unduly burdensome discovery. **See, e.g., FED. R. CIV. P. 26(b)(1) (authorizing *sua sponte* judicial intervention if the discovery is "unduly burdensome or expensive, taking into account the needs of the case, the amount in controversy, limitations on the parties' resources, and the importance of the issues at stake in the litigation").**

35 An early pretrial conference might avoid this problem if the court could be persuaded to order discovery in "phases." The propriety of "phased" discovery in complex litigation has been approved by the Texas Supreme Court. **See Jampole v. Touchy, 673 S.W.2d 569, 574 (Tex. 1984).**

36 **See generally Black & Lilienfield, supra note 1.**

GARDERE WYNNE SEWELL & RIGGS, L.L.P.
a plaintiff's symptoms are known to result from exposure to a particular substance. They are also generally familiar with the medical literature regarding individual or epidemiological studies and may provide useful introductory information.

In some cases, it may be appropriate to consult other medical specialists. In cases involving occupational cancers, for example, oncologists, who study tumor development, may provide useful information. Likewise, pathologists and radiologists may aid in tissue analysis and tumor identification.

Each witness or consultant should be furnished complete information regarding the plaintiff prior to examination or consultation. Because of the need for complete information, all other neutral and internal discovery should be concluded prior to consultation. Properly conducted neutral and internal discovery should provide sufficient information regarding the plaintiff's family, social, clinical, and occupational history, as well as epidemiological data, if any. With this background data, the consultant's job is substantially simplified.

5. **Deposing the Expert**

a. **Preparation**

The focal point of any toxic tort case is the plaintiff's expert witness. The plaintiff's expert must supply essential proof regarding the causal link between the plaintiff's disease and the chemical to which he was exposed. As a result, preparation for the expert's deposition must be exhaustive.

Preparation should begin with a set of interrogatories served on the plaintiff. In addition to requesting the identity of the expert and the substance of his testimony, the interrogatories should require specification of all materials the expert has reviewed in connection with his testimony, as well as scientific treatises or articles upon which the expert will rely in stating his opinion. Contrary to other forms of litigation, an answer that the expert's identity is "privileged" should not be accepted. If the plaintiff is suffering from a serious disease, prompt disclosure of the plaintiff's expert is essential. Defense experts are entitled to a complete disclosure of the plaintiff's expert evidence prior to administering physical examinations. The plaintiff's death prior to expert designation renders such an examination impossible. Thus, if a plaintiff fails to disclose expert data within a reasonable time, he should be compelled to do so by court order.

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After the plaintiff's expert has been designated and the bases for his opinions have been disclosed, counsel should contact the defense experts. The experts should receive copies of the plaintiff's interrogatory responses and be requested to search the medical and scientific literature for epidemiological and animal studies regarding the relationship between the plaintiff's disease and the suspect chemical.

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37 See Grant, *Establishing Causation in Chemical Exposure Cases*, supra note 1, at 163 (discussing the use of toxicological proof).

In many cases, the literature will not demonstrate any causal link, suggesting that the plaintiff's expert's opinion is not generally accepted in the scientific community. If the literature suggests a causal connection, counsel should review the materials and obtain a full understanding of how the chemical operates to cause disease or injury. Counsel's familiarity with scientific mechanisms and terminology will preclude the expert from using broad generalizations. For example, testimony that benzene causes blood disorders, cancer, or even leukemia can be seriously misleading. Benzene is not linked to all blood disorders and cancers, nor is it even linked to all forms of leukemia. Unless counsel is prepared to discuss these limitations, however, this broad testimony may be used to establish causation—even when a link between the chemical and the plaintiff's specific disease has never been established scientifically.

The final preparatory step requires confirming the existence of the plaintiff's disease. In view of the limited range of diseases known to be associated with toxic substances, precise diagnosis is crucial. Ideally, the plaintiff should be subjected to a physical examination, and his medical records, including laboratory data, should be reviewed thoroughly. If a plaintiff dies before a physical examination can be performed, autopsy findings should be secured and reviewed.

b. General procedures

The deposition of a plaintiff's expert in a toxic tort case generally follows a traditional personal injury pattern. However, the use of novel scientific evidence and the relevance of specialized disciplines renders some traditional inquiries extremely important. The nature of the expert's qualifications, the reliability of his diagnosis, and the scientific credibility of his opinions must be explored thoroughly.

The expert's qualifications, or lack thereof, are often the key to effective impeachment. Treating physicians, for example, are commonly not qualified as experts in toxicology, epidemiology, or industrial hygiene. Nevertheless, they are often retained as expert witnesses on the issue of causation. These limitations should be explored early in the deposition by a complete review of the expert's training and experience, as well as by direct questions regarding his particular fields of expertise.

As discussed earlier, a precise diagnosis of the plaintiff's disease is essential to the expert's credibility. Errors or uncertainties in diagnosis may prove extremely damaging by suggesting nonchemical causes, or even eliminating chemical involvement entirely. For example, although high-level chronic exposure to benzene has been associated with acute myelogenous leukemia (AML), it has not been linked to chronic myelogenous leukemia (CML). However, the terminal phase of CML, known as the “acute

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39 "General acceptance" of scientific theories is a prerequisite to their admission into evidence. This requirement is discussed supra note 32.

40 To date, benzene carcinogenicity has been credibly associated only with acute myeloleukemia. See, e.g., Rinsky, Young & Smith, Leukemia in Benzene Workers, 2 AM. J. INDUS. MED. 217 (1981); Infante, Wagoner, Rinsky & Young, Leukemia in Benzene Workers, LANCET, July 9, 1977, at 76. Other common assumptions, including estimates that 20-40% of all cancers are occupationally related, also cannot be maintained scientifically. Although early reports supported these estimates, see NATIONAL CANCER INSTITUTE, NATIONAL INSTITUTE OF ENVIRONMENTAL HEALTH SCIENCES, & NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH, ESTIMATES OF THE FRACTION OF CANCER IN THE UNITED STATES RELATED TO OCCUPATIONAL FACTORS 22 (1978), they now have been widely discredited, and many of the participants have admitted that their assumptions were "incorrect." See Davis, Bridbord & Schneiderman, Estimating Cancer Causes: Problems in Methodology, Production and Trends, 9 BANBURY REP. 285, 308 (1981). More realistic estimates fall below 10%. See, e.g., Doll & Petro, The Causes of Cancer: Quantitative Estimates of Avoidable Risks of Cancer in the United States Today, 66 J. NAT'L CANCER INST. 1240-41 (1981) (4%); Wynder & Gori, Contribution of the Environment to Cancer Incidence: An Epidemiologic Exercise, 57 J. NAT'L CANCER INST. 825 (1977) (1-10%); See generally Black & Lillienfield, supra note 1, at 745.

41 See Rinsky, supra note 40; Infante, supra note 40.

GARDERE WYNNE SEWELL & RIGGS, L.L.P.
blastic crisis," presents morphological patterns which closely resemble AML.\textsuperscript{42} To distinguish the diseases at this stage, a chromosomal study is necessary.\textsuperscript{43} Unfortunately, such cytogenetic studies are not always performed and without them, an AML diagnosis is debatable. These diagnostic lapses may preclude chemical exposure as a cause of the plaintiff's disease.

Finally, the expert's opinions should be evaluated. In Texas,\textsuperscript{44} as in many jurisdictions,\textsuperscript{45} a medical expert's opinion must be based on "reasonable medical probability." These precise words need not be used,\textsuperscript{46} but the testimony must indicate a significant degree of confidence.\textsuperscript{47} Counsel should require strict identification of the involved chemical and not allow the expert to speak of chemical families or groups. For example, there are a number of chemicals which resemble benzene in chemical structure, but have nonetheless been absolved of leukemic potential.\textsuperscript{48} Thus, testimony that the plaintiff's disease is caused by exposure to hydrocarbon solvents or benzene-related chemicals is extremely misleading and should not be accepted.

\textsuperscript{42} See generally J. Todd, CLINICAL DIAGNOSIS AND MANAGEMENT BY LABORATORY METHODS, 1068 (16th ed. 1979) [hereinafter cited as TODD]; H. Conn & R. Conn, CURRENT DIAGNOSIS, 471 (1980) [hereinafter cited as Conn & Conn].

\textsuperscript{43} See generally J. TODD, CLINICAL DIAGNOSIS AND MANAGEMENT BY LABORATORY METHODS, 1068 (16th ed. 1979) [hereinafter cited as TODD]; H. Conn & R. Conn, CURRENT DIAGNOSIS, 471 (1980) [hereinafter cited as Conn & Conn].

\textsuperscript{44} In typical CML, the Ph chromosome or "Philadelphia" chromosome is present in the marrow cells during both relapses and remissions. This is seen as an abnormally small chromosome 22 in which part of the long arm has been translocated to another chromosome, usually Number 9. See generally Todd, supra note 42, at 1067; Conn & Conn, supra note 42, at 470.


\textsuperscript{46} See Insurance Co. of N. Am. v. Myers, 411 S.W.2d 710, 713 (Tex. 1966), where the court stated: "Reasonable probability, in turn, is determinable by consideration of the substance of the testimony of the expert witness and does not turn on semantics or on the use by the witness of any particular term or phrase." See also Schaefer, 612 S.W.2d at 205 (holding that expert's use of "the magic words" of "reasonable probability" did not confer evidentiary weight in the absence of credible substantive testimony), cf. Otis Elevator Co. v. Wood, 436 S.W.2d 324 (Tex. 1968) (expert's testimony that trauma "could have" caused heart attack held probative where substance of testimony revealed that opinion was based on reasonable probability); But cf. Insurance Co. of N. Am. v. Kneten, 440 S.W.2d 52 (Tex. 1969) (holding that "possibility" testimony may be sufficient in cases where the causation question is within the knowledge and experience of the jury).

\textsuperscript{47} This confidence requires a credible discounting of other possible causes.

\textsuperscript{48} Toluene, for example, resembles benzene in its hydrocarbon structure and was linked to blood disorders in early studies. See, e.g., Greenberg, Meyers, Heimann & Moskowski, THE EFFECTS OF EXPOSURE TO TOLUENE IN INDUSTRY, 118 I.A.M.A. 573 (1942). However, recent studies have revealed that such disorders probably resulted from high benzene contamination of the toluene samples. NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH, CRITERIA FOR A RECOMMENDED STANDARD: OCCUPATIONAL EXPOSURE TO TOLUENE NO. NISM 73-11023 (1973). As presently manufactured, toluene contains only minute traces of benzene, and chronic exposure is generally considered nontoxic to the circulating blood and bone marrow. See generally NATIONAL RESEARCH COUNCIL, THE ALKY BENZENES, CH. VI, AT VI-13, 42 (1980); L. CASARETT & J. DOULL, TOXICOLOGY: THE BASIC SCIENCE OF POISONS 488 (1980).
The expert should be required to disclose all data which he has reviewed or relied upon in formulating his opinions. Typically, these sources include personal experiences, epidemiological studies, and toxicological evaluations. The expert's personal experiences may be the most vulnerable. For example, if a physician has failed to administer confirming diagnostic tests in one case, he may have failed to do so throughout his career. Likewise, if the expert carelessly combines chemicals into families and assumes that they have similar toxic effects, he has probably made the same error in other cases. Thus, the problems which appear in the expert's testimony regarding the plaintiff's condition may be used to challenge the reliability of his related experiences.

Epidemiological proof is also subject to criticism, especially if animal data is used. Reliance on animal studies presumes that they can be quantitatively extrapolated to human populations. However, this principle has not been accepted scientifically. Many chemicals suspected of toxic effects in humans do not produce similar effects in animals, and human epidemiology studies are often inconclusive or distinguishable. As general overviews of large cohorts, they merely forecast associations between particular chemicals and disease. Standing alone, their value in establishing causation in specific individuals is doubtful. Additionally, dissimilarities between the plaintiff's exposure and that of the epidemiological cohort can render analogies invalid. For example, a benzene study which demonstrates an association with leukemia at high concentration levels is significantly less reliable when the plaintiff's exposure levels are low or unknown.

Toxicological evidence presumes that the relationship between the chemical and disease mechanism can be demonstrated. To be credible, it must scientifically explain how the chemical affects the human body and how those effects instigate disease. The metabolic reactions after exposure must be carefully documented, most commonly by cellular or tissue analysis. An expert who has not conducted such tests, or who is unfamiliar with the body's metabolic response to the suspect chemical, is subject to serious

49 "Quantitative" evaluations seek to calculate human risks by two basic extrapolations. First, the test results obtained at high dose levels in animals are extrapolated to low dose levels in the test animals. Second, the estimated risks at those low doses are extrapolated to humans. See Schottenfeld & Haas, Carcinogens in the Workplace, 29 CA-A CANCER J. FOR CLINICIANS, 144, 152 (1979).

50 The principal problem with these quantitative evaluations concerns the shape of the dose response curve regarding low doses. Scientists are uncertain regarding whether the curve should be linear, or whether a threshold dosage should be recognized. To date, scientists have not determined specific levels of doses below which a carcinogen may be safely metabolized. See generally 1 ADVANCES IN MODERN TOXICOLOGY: NEW CONCEPTS IN SAFETY EVALUATION pt. 2, at 65 (M. Mehlman, R. Shapiro, & H. Blumenthal ed. 1979); Hoel, Animal Experimentation and its Relevance to Man, 32 ENVTL. HEALTH PERSP. 25 (1979). Based on these problems, Umberto Saffiotti of the National Cancer Institute has concluded that "[w]e do not presently have any reliable methods for a direct quantitative extrapolation from animal experiments to human carcinogenic hazards." Saffiotti, Experimental Identification of Chemical Carcinogens, Risk Evaluation, and Animal-to-Human Correlations, 22 ENVTL. HEALTH PERSP. 107, 110 (1978). See also INTERAGENCY REGULATORY LIAISON GROUP, SCIENTIFIC BASES FOR IDENTIFICATION OF POTENTIAL CARCINOGENS AND ESTIMATION OF RISKS, 265 (1979); Black & Lilienfeld, supra note 1, at 778.

51 See, e.g., Ward, Weisburger, Yamamoto, Benjamin, Brown & Weisberger, Long Term Effect of Benzene In C57BL/6N Mice, 30 ARCHIVES ENVTL. HEALTH 22 (1975) (reporting inability to induce leukemia in animals exposed to benzene).


53 Many benzene studies have evaluated cohorts exposed to unknown or relatively high concentrations. See, e.g., Vigilani & Saita, Benzene and Leukemia, 271 NEW ENG. J. MED. 872 (1964) (no measurements of concentration taken); Aksoy, Acute Leukemia Due to Chronic Exposure to Benzene, 52 AM. J. MED. 160 (1972) (concentrations varying from 30 to 210 ppm). By contrast, a number of studies have indicated no association between low-level benzene exposure and leukemia. See, e.g., Tsai, Wen, Weiss, Wong, McClellan & Gibson, Retrospective Mortality and Medical Surveillance Studies of Workers in Benzene Areas of Refineries, 25 J. OCCUP. MED. 685 (1983); Thorpe, Epidemiologic Survey of Leukemia in Persons Potentially Exposed to Benzene, 16 J. OCCUP. MED. 375 (1974).

GARDERE WYNNE SEWELL & RIGGS, L.L.P.
impeachment. For example, the disease process of cancer is not yet fully understood, and most experts cannot explain why the plaintiff developed a disease when the majority of similarly exposed workers did not.\footnote{Assessment of cancer risks regarding particular individuals lies "at the frontiers of science" because of the great number of questions which remain unanswered. See INTERAGENCY REGULATORY LIAISON GROUP, SCIENTIFIC BASES FOR IDENTIFICATION OF POTENTIAL CARCINOGENS AND ESTIMATION OF RISKS 76-77 (1979).} Experts who argue that some persons are more "susceptible" to chemical injury should be asked whether they have any medical data which demonstrates the plaintiff's increased susceptibility.\footnote{Although "susceptibility" may result from an individual's metabolic characteristics, these cannot be considered in a vacuum: Even among occupational groups that have been heavily exposed to potent chemical carcinogens, some of the workers have remained free of cancer. Other factors must distinguish between those who develop cancer and those who do not. The way in which these individuals metabolize the carcinogenic chemicals, either to metabolites that directly induce cancer in the exposed cells or to harmless ones, is undoubtedly one fact or determining whether or not an individual will get cancer. Metabolism appears to be partly under genetic control, but is also influenced by the diet and by exposure to drugs or other environmental chemicals. Thus, it is more reasonable to expect that the way in which these individuals metabolize the carcinogen, their genetics, their diet, and their exposure to other environmental chemicals than to simply classify these carcinogens as occupationally induced without also tabulating the responsibility of these other factors in their causation. Bates, Preventing Occupational Cancer, \textit{28} Env'tl. Health Persp. 303, 304 (1979) (citations omitted).} Typically, the plaintiff's medical history is insufficient to support such conclusions.

6. \textbf{Challenging Expert Opinions}

From previous discussions, it can be seen that the plaintiff's case often depends on novel scientific theories to establish causation. These range from the famous "one-hit" exposure theory\footnote{This progressive theory asserts that since science has not determined "safe" levels of exposure below which individuals will not develop cancer, it must be presumed that there are no such levels. Under this theory, brief low-level exposure to carcinogens are deemed sufficient to cause disease. See generally S. Epstein, \textit{The Politics of Cancer} (1978). Such a presumption fails to meet the criteria needed for scientific proof in litigation because it impermissibly shifts the burden of proof. In litigation, the burden remains on the plaintiff to show that his disease was actually caused by low-level exposure. The absence of scientific proof on this issue is fatal. See Parker, 440 S.W.2d at 49 (expressly rejecting "one-hit" theory in cancer cases); see also Large & Michie, supra note 52, at 607 ("It is one thing to prove danger and quite another to prove safety."). See generally Prosser, supra note 16, at \S 41.} to sophisticated extrapolation of animal data to prove causation in humans. The use of such evidence creates unique opportunities for defense counsel to challenge the admissibility of this progressive proof. If the plaintiff attempts to rely upon novel theories which have not been generally accepted by the scientific community, such evidence may be legally unreliable and hence, inadmissible.

Under the federal and state rules of evidence, issues regarding admissibility of expert opinions are entrusted to the discretion of the trial court.\footnote{Fed. R. Evid. 104(a) provides: "Preliminary questions concerning the qualification of a person to be a witness, the existence of a privilege, or the admissibility of evidence shall be determined by the court . . . ." The same provision is included in the Texas evidentiary rules. See TEX. R. EVID. 104(a). Similarly, the "facts or data" upon which an expert bases an opinion must be "of a type reasonably relied upon by experts in the particular field." TEX. R. EVID. 703. Under these rules, the reliability and hence, admissibility, of novel scientific evidence is to be determined by the court. An opinion's basic reliability does not "go to the weight" of the evidence. See 3 J. Weinstein & M. Berger, \textit{Weinstein's Evidence}, \$703[03], at 703-17 (1978).} In order to be admissible, expert opinions must be objectively reliable and not the product of speculation or unaccepted experimentation. This principle was first acknowledged in the landmark case of \textit{Frye v. United States},\footnote{293 F. 1013 (D.C. Cir. 1923).} which involved the use of polygraph tests in criminal trials. In ruling that the test was not admissible, the D.C. Circuit held that before a scientific...
principle can be used in evidence, it must be generally accepted among scientists in the field.59 This requirement interposes a substantial obstacle to the unrestrained admission of evidence based upon new scientific principles.60 Under Frye, it is the duty of the court to decide whether a principle has been generally accepted. This determination can be based upon the testimony of other experts, scientific literature, or judicial precedent. Since its decision, the Frye principles have been applied in civil cases to determine the reliability of various scientific advances, including paternity tests,61 voiceprints,62 and polygraph examinations.63 In criminal actions, the reasoning of Frye has been employed to judge the admissibility of evidence based on hypnosis,64 truth serum,65 voice spectrograms,66 and a number of other scientific practices.67

59 As the court stated:
Just when a scientific principle or discovery crosses the line of experimental and demonstrable stages is difficult to define. Somewhere in this twilight zone the evidential force of the principle must be recognized, and while the courts 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.

60 People v. Kelly, 17 Cal. 3d 24, 549 P.2d 1240, 130 Cal. Rptr. 144 (1976). The “primary advantage” of the Frye test is its realistic evaluation of the effect of “expert” testimony on jurors:
There has always existed a considerable lag between advances and discoveries in scientific fields and their acceptance as evidence in a court proceeding. . . . Several reasons founded in logic and common sense support a posture of judicial caution in this area. Lay jurors tend to give considerable weight to “scientific” evidence when presented by “experts” with impressive credentials. We have acknowledged the existence of a “misleading aura of certainty which often envelops a new scientific process, obscuring its currently experimental nature.”


64 [The burden is on the proponent of the new technique to show a scientific consensus supporting its use; if a fair overview of the literature discloses that scientists significant either in number or expertise publicly oppose that use of hypnosis as unreliable, the court may safely conclude that there is no such consensus at the present time.


The Texas Supreme Court has employed reasoning similar to Frye in determining the reliability of causation testimony in cancer cases. In Parker v. Employers Mutual Liability Insurance Co. of Wisconsin, an employee claimed workers' compensation benefits for cancer allegedly caused from workplace radiation. Although the jury found in favor of the plaintiff, the court of appeals reversed and rendered judgment for the defendant, holding that there was no evidence that the plaintiff's cancer was related to occupational exposure to radiation. In affirming the appellate court's judgment, the Texas Supreme Court discussed the criteria necessary to raise a fact issue on causation. The court noted three categories of causation issues and discussed the evidence necessary to allow each category to be considered by the jury.

The first category discussed in Parker concerned causation which can be resolved by "general experience or common sense." Cases involving automobile accidents, for example, involve situations in which "reasonable men know, or can anticipate, that an event is generally followed by another event." According to the court, the mysterious etiology of cancer does not fall within this classification.

The second Parker category involves proof based on "scientific generalizations." This is the traditional realm of expert testimony considered in Frye. In these cases, the scientific rules are established as categorical "laws," which suggest that certain effects are "always" linked to a particular cause. Such cases might include medical malpractice cases based upon foreign objects or misdiagnosis, where predictable physical consequences result from an identifiable wrongful act. In a toxic tort case, toxicological testimony regarding scientific causes and effects falls within this category and should be measured by this standard.

The final Parker category is also commonly encountered in toxic tort litigation. This class of cases involves "probabilities of causation." Such proof involves the measurement of coincidences to reliably recognize a cause and effect relationship. Obviously, epidemiological proof is included in this classification. The court stressed that these "probabilities" must be theoretically explained and be more than mere "coincidences."

Applying these standards, the Parker court concluded that there was no evidence which established a causal relationship between the plaintiff's disease and occupational radiation exposure. To establish the relationship, the plaintiff was required to show either identifiable trauma, or in the case of chronic exposure,
a statistical probability which demonstrated a causal link between exposure and disease.\textsuperscript{75} In short, the relationship must have been demonstrated by reliable toxicological or epidemiological proof. Although the court recognized that its holding might place "extraordinary burdens of proof" on claimants, it concluded that:

[O]nce the theory of causation leaves the realm of lay knowledge for esoteric scientific theories, the scientific theory must be more than a possibility to those who created it. For to the scientific mind, all things are possible. And with all things possible, citizens would have no reasoned protection from the speculations of courts and juries.\textsuperscript{76}

The \textit{Parker} rule was recently followed in \textit{Schaefer v. Texas Employers Insurance Association},\textsuperscript{77} another workers' compensation decision. In that case, the court concluded that the claimant's toxicological and epidemiological proof raised no more than a "speculation and surmise" that his disease was related to occupational hazards.\textsuperscript{78}

\textit{Parker} and \textit{Schaefer}, consistent with \textit{Frye} and other holdings,\textsuperscript{79} recognize that the plaintiff must meet certain threshold criteria before his toxicological and epidemiological data are admitted for jury consideration. In order to assert novel toxicological evidence, such as the one-hit theory, plaintiff must initially establish that the principle is an accepted scientific generalization. The toxicological evidence must consist of "uniform physical rules, natural laws, or general principles, which the jury must apply to the facts."\textsuperscript{80} Theoretical toxicological speculations, however innovative, do not meet this standard. As \textit{Parker} recognizes, courts are not appropriate forums to resolve scientific disputes.\textsuperscript{81} Absent a consensus of scientific support, novel toxicological theories are simply too speculative for jury consideration.

\textsuperscript{75} The court found no "reasoned relationship" between the radiation and the cancer. According to the court, this could not be established due to uncertainties regarding plaintiff's level of exposure. \textit{Id.} at 48. Moreover, the court reasoned that the general statistical association between radiation and cancer was not sufficient to establish causation. This was because "the other causes such as natural radiation, virus, and infection [were not] designated improbable by either the expert testimony or the circumstances of plaintiff's cancer." \textit{Id.}

\textsuperscript{76} \textit{Id.} at 49.

\textsuperscript{77} 612 S.W.2d 199 (Tex. 1980). Although it might be argued that \textit{Parker} and \textit{Schaefer} concerned only evidentiary sufficiency, rather than admissibility, this is an artificial distinction. Given the court's clear condemnation of unreliable scientific proof, the reasoning that deems such proof "no evidence" should likewise control its admissibility. Moreover, juries have a recognized tendency to give greater weight to "expert" evidence, however experimental it may be. See \textit{Addison}, 498 F.2d at 744; \textit{Kelly}, 17 Cal. 3d at 24, 549 P.2d at 1240, 130 Cal. Rptr. at 144; 


\textsuperscript{78} \textit{Schaefer}, 612 S.W.2d at 204.


\textsuperscript{80} \textit{Hand, supra} note 72 (quoted in \textit{Parker}, 440 S.W.2d, at 46 n.5 (1969)).

\textsuperscript{81} "If the experts cannot predict probability in these situations, it is difficult to see how courts can expect a jury of laymen to be able to do so." \textit{Parker}, 440 S.W.2d at 49.
Similarly, under the Parker criteria, epidemiological proof must satisfy traditional reliability tests before it can be considered by a jury. The most important probability criteria stressed in Parker is that the proof must credibly eliminate "other reasonable causal explanations." As a practical matter, this means that a reliable epidemiological study must research each cohort's history to credibly eliminate other sources of disease. The Schaefer decision points out several other reliable indicia crucial to epidemiologic evidence. Under Schaefer, a plaintiff's exposure to the precise substance used in the study must be confirmed, and the manner of exposure must be substantially similar to those of the studied cohorts. With this emphasis on parallel circumstances, animal studies should be particularly disfavored. Such studies not only involve nonhuman cohorts, but also commonly expose those cohorts to concentrations which greatly exceed realistic human risks. As a result, animal epidemiology is not generally accepted to predict disease incidence in humans and should not be admitted as proof of causation.

IV. CONCLUSION

Although the complexities of toxic tort litigation may initially present bewildering perspectives, creative defense strategies have been developed to expedite case preparation. These strategies require defense counsel to develop a cooperative attitude and to refrain from unnecessary adversarial confrontations. Ideally, defense goals can be achieved through a joint defense arrangement. Even when separate counsel are used, however, cooperation can avoid duplicative discovery. Likewise, coordination of depositions and expert witnesses may also result in increased efficiency.

Strategically, discovery should initially focus on product identification and injury analysis. These issues are crucial to early case evaluation and should be investigated prior to broad discovery on the merits. If a plaintiff seeks untimely or excessively burdensome discovery, protective orders should be requested to delay such inquiries until these preliminary phases are completed.

Scientifically, toxic tort cases often involve highly innovative theories of medical causation. In order to challenge these theories effectively, defense counsel must understand the basic scientific literature and

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82 Id. at 48. See also Schaefer. 612 S.W.2d at 204; Garner v. Hecla Mining Co., 19 Utah 2d 367, 369, 431 P.2d 794, 796 (1967) (holding that epidemiological data showing high rate of cancer in uranium miners not conclusive in view of decedent's history of cigarette smoking); Clark v. State Workmen's Compensation Comm'r, 155 W. Va. 726, 187 S.E.2d 213 (1972) (recovery denied where other causes of leukemia not credibly eliminated).

83 The Schaefer court noted that the organism to which plaintiff was exposed was not isolated in the laboratory or in the plaintiff's working environment. Schaefer, 612 S.W.2d at 201, 204. Hence, the court could not determine whether plaintiff's disease was caused by the same organism implicated in epidemiological studies. The court's rejection of such evidence was consistent with standard reliability tests for epidemiological studies. As Michael Dore has stated: "A study should account for all relevant risk factors, standardized for age, sex and race, and involve significant exposures to the alleged causative factor. The court should exclude any study that does not sufficiently isolate the alleged causative factor..." Dore, supra note 77, at 439 (emphasis added); see also Dickson, Medical Causation by Statistics, 17 FORUM 792, 799-808 (1983).

84 Although the Schaefer court recognized that some epidemiological studies had been conducted among coal miners, sandblasters and farmers, it noted that "no studies have ever been conducted with the plumbing trade. In fact, according to the record, this is the first reported case in which a plumber has contracted the disease." Schaefer, 612 S.W.2d at 201. The court also noted that plaintiff's experts had failed to evaluate soil samples from plaintiff's environment. Id. at 204. Hence, contamination similar to the studies cohorts could not be confirmed. See also National Comm'n on Egg Nutrition v. FTC, 570 F.2d 157, 161 (7th Cir. 1977), cert. denied, 439 U.S. 821 (1978) (requiring that epidemiological studies be conducted using "scientific methodologies," performed by "competent and highly regarded investigators," reported in "recognized scientific journals after peer review" and "generally accepted by experts in the field and by the scientific community").

85 Although animal studies are often deemed sufficient to authorize regulation of substances, they do not satisfy the "probability" criteria necessary to impose tort liability. See Black & Lilienfield, supra note 1, at 777; Latin, The "Significance" of Toxic Health Risks: An Essay on Legal Decisionmaking Under Uncertainty, 10 ECOLOGY L.Q. 339, 377-80 (1982).

GARDERE WYNN SEWELL & RIGGS, L.L.P.
be prepared to raise specific objections to the admissibility of opinions which are not generally accepted in the scientific community. Such objections should preclude the admission of unreliable and misleading evidence and avoid verdicts based upon speculation.

Although toxic tort litigation poses immense challenges to defense counsel, it presents equally significant opportunities for creative practice. Without innovative approaches to trial preparation, these cases may become unmanageable before liability can be effectively evaluated. Such consequences may result in uninformed settlements—conveniently justified by overwhelming defense costs. While the strategies suggested in this article are certainly not exhaustive, they may lead to more informed decisions regarding case evaluation and disposition. Successfully pursued, they may permit just resolution of disputes according to their merits, rather than their economic impact.
APPENDIX

TELEX

[Author's company] has been served with a lawsuit styled [name, cause no., court where pending]. Your company is a co-defendant. [Author's company] hereby proposes that this action be defended by all defendants jointly through a single outside counsel. The cost of defense will be divided on a pro rata basis, subject to later adjustment if warranted by the facts. Potential cross-actions and conflict of interest problems can be deferred and/or reconciled informally.

Copies of the pleadings are being forwarded to you by express mail. [Author's company] proposed to retain [name of outside counsel] as primary defense counsel. If you wish to join this defense effort, please contact me at [telephone number]. A conference call is scheduled for [date, time] to discuss the joint defense effort. Your participation is encouraged.

[House Counsel]
Letter Agreement

[Date]
[Addresses]
Re: [Full Case Style]

Gentlemen:

This letter will confirm our agreement to participate in a joint defense of the above referenced action. The terms of our agreement are as follows:

1. The participating companies will be represented by [name, address, phone number of outside counsel].
2. Counsel's fees will be divided equally among the participating companies [or some other arrangement, if justified].
3. Each participating company will notify other participants of settlement intentions.
4. Each participating company may withdraw from the joint defense arrangement if a conflict of interest develops. However, prior notice of intent to withdraw shall be given to other participants.
5. Each participant agrees to refrain from filing cross-claims against other companies participating in the joint defense effort. This agreement shall not be construed as a waiver of rights to pursue such actions after withdrawal from the arrangement, or after the action is concluded.
6. Each participant agrees not to oppose the dismissal of the action against a participating co-defendant.
7. Each participant agrees not to retain the designated outside counsel in any subsequent action for contribution or indemnity.

Each of you will be contacted by [outside counsel] for information needed to answer the action. A meeting with [outside counsel] is scheduled for [date, time] at [location] to discuss defense procedures. I understand that each of you is available to attend. Your cooperation in this matter is appreciated. If any of my recitations are inaccurate, or if significant matters have been omitted, please advise by letter to all addressees.

Very truly yours,

[House Counsel]

Gardere Wynne Sewell & Riggs, L.L.P.
[Date]
[Outside Counsel]
Re: [Full Case Style]

Dear [Outside Counsel]:

This letter will confirm your retention as counsel for a joint defense group in the above referenced action. Enclosed please find copies of the organizational documents pertaining to the joint defense effort. You have confirmed that no conflicts of interest preclude your representation in this matter. If a conflict arises, please notify us promptly.

The companies participating in the joint defense group, together with their respective house counsel, are as follows:

<table>
<thead>
<tr>
<th>Name of Company</th>
<th>House Counsel</th>
</tr>
</thead>
<tbody>
<tr>
<td>[Full Corporate Name]</td>
<td>[Name, address, phone number]</td>
</tr>
</tbody>
</table>

Messrs. [names] comprise the defense committee in this matter. Under agreed procedures, they will be your primary contacts for the defense effort.

Your statements for services rendered will be paid by the group. Address your statement to [name of the chairman of the defense committee], chairman of the defense committee. He will coordinate payment. We understand your fees will be [hourly rate] and that work of associates will be billed at [hourly rate].

The defense committee will provide guidance to you regarding the conduct, trial, or settlement of this action. The defense committee will also authorize the retention of expert witnesses and consultants. Please do not retain any expert witnesses or consultants without defense committee approval.

The group requests that you employ certain standard administrative procedures in defending this action. These include:

1. Forwarding copies of all pleadings, motions, and correspondence to each house counsel.
2. Coordinating all requests for document production through the responsible house counsel.
3. Providing at least ten (10) days advance notice to each house counsel of all depositions, hearings, and meetings.
4. Directing routine legal research and witness preparation to affected house counsel for disposition.
5. Submitting a detailed status report to each counsel on a quarterly basis.

Finally, a meeting has been scheduled on [date, time] at [location] for you to meet the various house counsel and discuss the defense effort. I understand that you are available to attend.

GARDERE WYNNE SEWELL & RIGGS, L.L.P.
We look forward to working with you towards a favorable disposition of this action.

Very truly yours,
[House Counsel]