THE APPLICATION OF RULE 702 AND DAUBERT CHALLENGES TO EXPERT WITNESSES IN LARGE PROPERTY DAMAGE LITIGATION:

GETTING YOUR EXPERTS PAST THE GATEKEEPER AND INTO THE COURTROOM

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Introduction.

Large property losses resulting in substantial subrogation efforts grow from catastrophic damage or destruction to buildings, equipment and the economic injuries that result from those losses. The generic cause of such losses sometimes leads to first party coverage litigation, but pinpointing a specific cause is essential to the pursuit of subrogation claims. Proving third party negligence, or a product defect, as the cause of a covered loss depends on the retention of expert witnesses who are capable of providing the underlying basis for pursuit of subrogation lawsuits.

While major property losses usually arise from fires, subrogation claims can also spring from wind damage, building collapses and sprinkler and plumbing failures. Each theory requires expert testimony from consultants who are under increasing scrutiny to satisfy the evidentiary standards set by the federal courts. Here, we focus on the admissibility of opinion testimony from experts involved in fire investigations and various scientific and engineering principles (for example, electrical, mechanical and chemical) as applied to fire science and fire investigation, and review recent court decisions addressing those issues.

The success or failure of a complex subrogation case depends on the plaintiff's ability to present relevant and admissible scientific evidence. Given the federal court's repeated emphasis on reliability, methodology and testing, an insurance carrier, or its subrogation counsel, cannot simply assign a general fire cause and origin expert and expect that single witness to be permitted to provide opinions with regard to the area of the fire, the cause of the fire, the existence of a product defect, the spread of the fire or the operation of fire suppression systems. Rather, each scientific discipline requires a separate qualified expert and each of these experts are inevitably subjected to challenges by opposing parties.

We have all heard judges, counsel and parties in hotly contested cases involving technical and scientific issues refer to the litigation as a "battle of the experts." More importantly,

however, in order to get the experts onto the "battlefield," counsel and the parties must now be prepared to satisfy trial courts that those experts are properly qualified to present opinions that are reliable and admissible. Understanding the criteria for expert witness testimony will permit the practitioner to retain the proper experts, direct the necessary investigation, fact finding, analysis and testing and then present the expert opinions in a manner to meet those requirements for admissibility.

A. The Daubert Standard.

Until 1993, the admissibility of expert scientific evidence was governed by the Frye test, based on the Supreme Court case of Frye v. United States, 293 F. 1013 (Ct. App. D.C. 1923). The Frye analysis only allowed expert scientific testimony to be admitted if the underlying principles behind the opinion had gained "general acceptance" in the scientific community. The "general acceptance" standard was restrictive in many cases where the underlying theory was novel but otherwise scientifically reliable.

In 1973, the United States Supreme Court adopted the Federal Rules of Evidence, including Rule 702 governing expert testimony. Under Rule 702, the expert testimony must "assist the trier of fact to understand the evidence or to determine a fact in issue." Rule 702 also requires that the expert witness be "qualified as an expert by knowledge, skill, experience, training, or education" and that the testimony be reliable, *i.e.*, supported by "sufficient facts or data" and "reliable principles and methods" that are applied "reliably to the facts of the case." The rule did not require that the principles or methods be generally accepted in the field. Despite the "new" rule, Federal Courts consistently continued to apply the Frye test in deciding the admissibility of expert opinions.

Twenty years after the rule was adopted, the Supreme Court was asked to decide whether Rule 702 superseded the Frye test in the case of Daubert v. Merrell Dow Pharmaceuticals, Inc., 509 U.S. 579, 113 S.Ct. 2786, 125 L.ED. 2d 469 (1993). Justice Blackmun, who authored the majority opinion in Daubert, held that Rule 702 did supersede the strict Frye standard and required the trial judge to serve as "the gatekeeper" of expert testimony in deciding if it meets the standards of relevance and reliability. The trial court has discretion to conduct a hearing well in advance of trial to determine if the expert's testimony is reliable. "Daubert" hearings now are routine in Federal Court. In fact, many courts include deadlines to complete discovery and motions relating to Daubert issues in standard pretrial scheduling Orders. Parties use Daubert hearings to obtain discovery without having to take a deposition and pay the expert. For example, if the expert attends the hearing, as would be prudent, the challenging party has the right to take live testimony from the expert before the court, gaining valuable information that can then be further explored at a later deposition if the court ultimately deems that the expert may testify at trial.

Rule 702 specifically states:

> 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.

Fed. R. Evid. 702

Rule 702, as quoted above, was amended effective December 1, 2000. The advisory committee notes on the amendment point out that "[a] review of the caselaw after Daubert shows that the rejection of expert testimony is the exception rather than the rule." To be sure, "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). In fact, the courts have frequently described the net effect of Daubert as liberalizing the Rule 702 standard for admissibility of expert testimony. See, Cavallo v. Star Enterprise, 100 F.3d 1150 (4th Cir. 1996), cert. denied, 118 S.Ct. 684 (1998) and United States v. Dorsey, 45 F.3d 809 (4th Cir. 1995), cert. denied, 515 U.S. 1168 (1995). Further, the advisory notes to the 2000 amendment make clear that, in accordance with the Supreme Court's directive in Kumho Tire Co. v. Carmichael, 527 U.S. 137 (1999), Rule 702 is "not intended to provide an excuse for the automatic challenge to the testimony of every expert."

In order to be admissible under Daubert, expert testimony must be based in "valid reasoning and reliable methodology." In re TMI Litig., 193 F.3d 613, 665 (3d Cir. 1999), amended by, 199 F.3d 158, cert. denied sub nom., General Public Util. Corp. v. Abrams, 120 S.Ct. 2238 (2000). An abuse of discretion occurs if a trial court excludes testimony simply because it does not deem the proposed expert to be the best qualified or because the proposed expert does not have the specialization that the court considers most appropriate. Holbrook v. Lykes Bros. S.S. Co., 80 F.3d 777, 782 (3d Cir. 1996). In Kumho Tire, the Supreme Court emphasized that the admissibility inquiry under Rule 702 of the Federal Rules of Evidence and Daubert is a "flexible one." The factors mentioned in Daubert do not constitute a "definite checklist or test." Kumho Tire, 527 U.S. at 141. These factors were meant to be helpful, not definitive, and the factors may or may not be pertinent in assessing reliability, depending upon the nature of the issue in the case, the expertise of the particular witness and the subject of the opinion testimony. Id. at 150.

The focus when assessing the reliability of an expert opinion under Daubert is on the principles and methodology of the expert in arriving at opinions, not on the conclusions that are generated by the expert. Daubert, 509 U.S. at 595. In some cases, the reliability of an expert witness may be based upon his personal knowledge or experience. Kumho Tire, 526 U.S. at 156. The trial court must determine whether the expert's training and qualifications relate to the subject matter of the proposed testimony. Id. This testimony must be supported by appropriate validation – i.e. "good ground" based upon what is known by the evidence. Isely v. Capuchin Province, 877 F.Supp. 1055 (E.D. Mich. 1995). As noted in In re Paoli RR Yard PCB Litigation, 35 F.3d 717 (3d Cir. 1994), proponents of expert testimony:

> do not have to demonstrate to the judge by a preponderance of the evidence that the assessments of their experts are correct, they only have to demonstrate by a preponderance of evidence that their opinions are reliable. . . The evidentiary requirement of reliability is lower than the merits standard of correctness.

Id at 744.

Further, district courts do not have discretionary authority to "accept or reject" expert testimony, as parties often invite the court to do. Acceptance or rejection of expert opinions is part of the jury's fact-finding role:

> Vigorous cross-examination, presentation of contrary evidence, and careful instruction on the burden of proof are the traditional and appropriate means of attacking shaky but admissible evidence.

Daubert, supra, 509 U.S. at 596.

One court has pointed out that, in order to avoid encroaching on the jury's function, the court's "gatekeeping" function under Daubert must be regarded as a limited function:

> Trial judges must exercise sound discretion as gatekeepers of expert testimony under Daubert. Fuller, however, would elevate them to the role of St. Peter at the gates of heaven, performing a searching inquiry into the depth of an expert witness's soul – separating the saved from the damned. Such an inquiry would

> inexorably lead to evaluating witnesses' credibility and weight of the evidence, the ageless role of the jury.

McCullock v. H.B. Fuller Company, 61 F.3d 1038, 1045 (2d Cir. 1995).

B. The Role of NFPA 921 and its Methodology in Deciding Daubert Issues.

The most widely used Daubert attack typically centers on the methodology issue. The courts have refined four factors that bear on that analysis: Whether the methodology or technique: (1) has been tested, (2) has been subject to a peer-review process and/or published in the scientific community, (3) has been used with controlled standards and/or has produced a rate of error that is quantifiable and low rate, and/or (4) is generally accepted in the field.

Fire investigators must follow NFPA 921 when formulating their opinions. The methodology used by origin and cause experts has evolved and undergone refinement over the last decade. The National Fire Protection Association, a world-renowned leader in fire safety, publishes a guide for fire and explosion investigations that sets forth a basic methodology, *i.e.*, the "scientific method". See, N.F.P.A. 921 Guide For Fire and Explosion Investigations. The American Society of Testing and Materials also publishes guides for the collection and preservation of evidence and collecting and testing information and evaluating technical data. See, ASTME – 1188; ASTME – 860; and ASTME – 678. As is succinctly explained by the National Fire Protection Association itself, NFPA 921 was "designed to produce a systematic, working framework or outline by which effective fire investigation and origin and cause analysis can be accomplished."

This standard has been consistently recognized as the proper methodology for fire cause and origin determination. See, Workman v. AB Electrolux Corporation, 2005 WL 1896246 (D. Kan. 2005); Chester Valley Coach Works v. Fisher-Price, 2001 WL 1160012 (E.D.Pa. 2001); Booth v. Black & Decker, 166 F.Supp.2d 215 (E.D.Pa. 2001). Indeed, in McCoy v. Whirlpool

Corp., 214 F.R.D. 646 (D. Kan. 2003), rev'd. 379 F. Supp. 2d 1187 (D. Kan. 2005), the district court described NFPA 921 as the "gold standard" of methodologies for fire investigation.

Convincing the court that a fire investigator followed the scientific method for fire investigations described in NFPA 921 is crucial to the admissibility of any opinions that are generated from that investigation. In TNT Road Co. v. Sterling Truck Corp., 2004 WL 1626248 (D. Me. 2004), a motion to exclude the testimony of a fire cause and origin investigator in a truck fire case was denied. There, the plaintiff's expert concluded that the fire started spontaneously in the truck's ignition switch and the fire could only have started if the switch was defective. The court found the expert's methodology to be reliable and substantially in compliance with NFPA 921.

The court recounted in detail the nature of the expert's investigation and held that the plaintiffs appropriately presented evidence, demonstrated the reliability of the expert's methodology, and that his investigation of the subject fire did conform with the standards set forth in NFPA 921.

Significantly, the court commented that whether the expert:

> substantially completed his investigation after two hours or whether he kept an open mind and continued to reevaluate his opinion goes to weight. The fact that Adams may have formed his cause and origin opinion quickly might suggest a slipshod investigation or it might suggest that the evidence was relatively easy to interpret and clearly pointed to the ignition switch...[He]continued to evaluate his opinion in light of subsequent testimony by fact witnesses and ... none of that evidence rules out his opinion or exposes his basic methodology as unreliable.

Id. at *5.

The cases of Michigan Millers Mutual Insurance Corporation v. Benfield, 140 F.3d 915 (11th Cir. 1998) and Booth v. Black and Decker, Inc., 2001 WL 366631, Docket No. 98-6352 (E.D. Pa. April 12, 2001) are two of the earliest decisions addressing the evidentiary standard for

allowing or excluding the testimony of a fire investigator who opines on the origin and cause of a fire. Each case struck the testimony of a purported expert whose methodology was determined to be unreliable in that it was not supported by peer review studies or by recognized or generally accepted guidelines in the field of fire science.

In Michigan Millers, supra., the court struck the testimony of plaintiff's origin-and-cause investigator, Bill Buckley, who concluded that a fire had been intentionally set by the homeowner. There was no dispute that the fire had started on the homeowner's dining room table near a plastic lamp oil bottle that—before the fire – had been half-full and sealed by a screw top lid. On the table had also been a pile of the homeowner's laundry. Hanging above the table had been a chandelier. After the fire, the lamp oil bottle was found undamaged and undeformed, but it was empty of its contents with the screw top a few feet away. Mr. Buckley opined that the homeowner emptied the contents of the lamp oil on the laundry and then set it afire based on having eliminated any accidental source of ignition where the fire originated. In striking that opinion, the court noted that fire science is a field of expertise subject to the court's gatekeeper role, and found that Buckley's methodology was unreliable for the following reasons:

> Essentially, the testimony of Buckley reveals that he came to his opinion that the fire was incendiary largely because he was unable to identify the source of ignition of the fire. In determining that the fire was incendiary, Buckley performed no tests and took no samples. At trial, Buckley was unable to describe the chandelier that hung over the table and unable to explain the methodology by which he eliminated the chandelier as a possible ignition source for the fire. After telling the jury on direct that he believed someone poured lamp oil from the lamp oil bottle over the clothes and set the clothes ablaze, on cross-examination Buckley admitted that he did not know even if the lamp oil bottle had contained lamp oil before the fire and that there was no scientific basis for such an opinion.

140 F.3d at 921.

Similarly, in Booth v. Black and Decker, Inc., 2001 WL 366631 (E.D. Pa. 2001), the court granted defendant's motion for summary judgment after disqualifying the testimony of plaintiff's expert, Richard B. Thomas, who was prepared to testify that Black and Decker's toaster oven was defective and caused a fire. Although the court found that Mr. Thomas's professional background would otherwise have made him a qualified expert, it struck his testimony based on his unreliable methodology, beginning the analysis as follows:

> Thomas' qualifications are not at issue, and thus, my focus today is on his methodology. To assess an expert's methodology under Rule 702, Daubert and Kumho Tire, a district court must, according to the Court of Appeals for the Third Circuit, be mindful of the following factors: (1) whether a method consists of a testable hypothesis; (2) whether the method has been subjected to peer review; (3) the known or potential rate of error; (4) the existence and maintenance of standards controlling the technique's operations; (5) whether the method is generally accepted; (6) the relationship of the technique to methods which have been established to be reliable; (7) the qualifications of the expert witness to testify based on the methodology; and (8) the non-judicial uses to which the method has been put.

Booth v. Black & Decker, 2001 WL 366631 at *3 (citations omitted).

The court then closely examined Mr. Thomas' methodology, finding it inadequate for the following reasons:

> Thomas asserted that his method of investigating the cause of the fire was a standard method applied by others in the field, but he produced no persuasive, objective evidence that his method was subject to peer review, had a known or potential rate of error, could be measured against the existing standards, or was generally accepted, as required by Rule 702, Daubert, Kumho Tire, and Oddi [v. Ford Motor Co., 234 F.3d 136 (3d Cir. 2000)].

Id.

The court went on to note that had Thomas relied upon a methodology recognized by National Fire Protection Association 921, Guidelines for Fire and Explosion Investigations, his testimony may have been admissible, but that the expert failed to refer to any provisions or methodologies in NFPA 921 upon which he relied:

> The court was presented with no evidence, aside from Thomas' assurances, that others used the methodology he applied in investigating the cause of this electrical fire. Thomas claimed, only at the prompting of defense counsel, that he followed the general methodology of fire investigation established by the National Fire Protection Association, a lengthy and specific document that contains detailed discussions on investigations of everything from motor vehicles and Molatov cocktails to explosions and electrical fires. . . . Given NFPA 921's comprehensive detailed treatment of fire investigations, it appears that NFPA 921 might have contained a methodology upon which Thomas could have relied, but he failed to state that he applied any specific methodology contained in NFPA 921. In discussing his methodology in his testimony and reports, he did not refer to any specific section in NFPA 921. Furthermore, Thomas pointed to nothing in that document that provided a methodology for investigating the hypothesized cause of the fire in this case; spontaneous welding of contacts, resulting in the overheating of an electrical appliance. Thus, NFPA 921 offers no help to Thomas.
>
> While there is something intuitively appealing about Thomas' method, there is no evidence that the method he applied was subject to peer review, had a known or potential rate of error, could be measured by existing standards, or was generally accepted. Furthermore, there was no establishment of reliability of a relationship between the technique and the methods. Though Thomas may be qualified to testify in these matters, he did not take sufficient care in supporting his credibility or reliability of the methodology he applied, despite the best efforts of counsel to elicit it. Therefore, I conclude that Thomas' testimony that there was a manufacturing defect in the toaster oven is not admissible.

Id. at *4.

The federal courts have continued to rely on NFPA 921 to evaluate the reliability of cause and origin investigations. More recently, the 8th Circuit in Hickerson v. Pride Mobility Products Corporation, 470 F.3d 1252 (8th Cir. 2006) reversed summary judgment in a case alleging that a defect in a wheel chair was the cause of a fire. The court found the origin-and-cause expert, who was offered to testify that the wheelchair was in the fire origin area and was the only potential source of the fire, to be qualified to give that opinion, stating:

> The methodology he used to generate his opinion is sound. He examined burn patterns, examined heat, fire, and smoke damage, considered this evidence in light of testimony regarding the fire, and identified a point of origin. He then considered as possible causes of the fire those devices that contained or were connected to a power source and that were located at the identified point of origin. He eliminated as possible sources those devices that were not in the area of origin or that were not connected to a power source and contained no internal power source. We can find nothing unreliable in this accepted and tested methodology. See, e.g., Weisgram v. Marley Co., 169 F.3d 514, 519 (8th Cir. 1999) ("Now, as a qualified expert in fire investigation, Freeman was free to testify – as he did – that the burn and smoke patterns and other physical evidence indicated that, in his opinion, the fire started in the entryway and radiated to the sofa.").

Id. at 1257.

C. Is Testing Required to Satisfy Rule 702?

By far, the most common argument against the admission of opinion testimony in fire related cases is based upon the failure of the expert to "test" his hypothesis in order to prove the reliability and validity of his theory. Virtually every reported decision addressing Rule 702 and Daubert issues in fire investigation cases contain a discussion with respect to the testing, or lack thereof, by an expert. In some cases, even testing which ostensibly recreates a fire scenario has been found to be unreliable.

As discussed above, following proper methodology while performing a fire investigation is critical. The failure to do so will virtually ensure a fatal result in fire cases. The answer to the "testing" question is not as clear. Rather, the decisions appear to be driven by the specific facts and theories in particular cases. While the courts are admonished to avoid making credibility assessments as to the correctness or soundness of an expert theory, many Daubert decisions are result oriented. When the courts believe that a particular theory is extreme, far fetched or not supported by credible facts, the tendency is to reject the expert opinion based upon Daubert and Rule 702 considerations. The problem, of course, with having consultants perform testing is that it places a party in a "Catch-22" situation. Not every fire scenario can be re-created through testing, although there is often valid scientific and investigative support for the conclusions offered by the expert. Performing tests which do not yield the proper results may, by itself, preclude the expert. Conversely, performing no tests will certainly result in a hard-line Daubert challenge by your opponent.

1. Experts Stricken for Lack of Proper Testing.

In Fireman's Fund Ins. Co. v. Canon, No. 394 F.3d 1054 (8th Cir. 2005), the 8th Circuit affirmed the district court's grant of summary judgment and motion to exclude expert testimony of the plaintiff's origin-and-cause investigator and electrical engineer in a suit alleging Canon's copy machine was the cause of a fire. The Court affirmed the rulings on the basis that the experts' opinions were unreliable because they failed to apply NFPA 921 guidelines to the facts. This, despite three experimental tests conducted on an exemplar copy machine used to support their theory that the copier's upper fixing heater assembly caused the fire.

The plaintiff's theory was that the copier had a defective thermal fuse design and the experts' tests bypassed the copier's heater control circuitry so as to focus on the thermal fuse.

Electrical current was applied directly to the heating element and produced a thin brown scorch line on a sheet of paper fastened to the heating element before the thermal fuse opened to shut off the current. Based on these tests, the experts concluded that the design of the copier was defective and caused the ignition of combustible materials inside the copy machine.

The court found the testing deficient primarily because the experts could not explain how the heater control circuitry allegedly failed (because they bypassed it in the tests) and why such a mystery failure would nonetheless allow an electrical current to flow to the heating element:

> We agree with the district court that this experimental testing did not meet the standards of NFPA 921. Anderson and Wald admitted that to actually start a fire without a bypass of the heater control circuitry and its embedded safety features, the heater control circuitry first would have to malfunction. This undescribed malfunction would have to supply an electrical current to the heating element precisely tailored to generate not just scorching, but also an open flame... Not only did the experimental testing fail to produce an open flame, but the experts were unable to explain the assumed heater control circuitry malfunction in theory or replicate it in any test. In short, the experimental testing of the heating element and thermal fuse in isolation did not establish that the thermal fuse would fail to prevent a fire caused by a heater control circuitry malfunction.
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> Additionally, examination of the thermal fuse in the burned copier revealed that no electrical current was flowing to the heating element when the fuse opened. In other words, the heating element was not activated when the rising environmental temperatures caused the fuse to open, suggesting that the heating element was not the source of the fire. NFPA 921 § 2-3.6 requires the investigator to "compare his or her hypothesis to all known facts," but Anderson and Wald did not attempt to reconcile this empirical evidence with their theory.

Id. at 1058-1059.

The experts in Pro Service Automotive L.L.C. v. Lenan Corp., 469 F.3d 1210 (8th Cir. 2006) suffered a fate similar to the experts in Fireman's Fund, supra. In that case, the plaintiff presented experts who provided opinions that a fire at the plaintiffs' place of business was

caused by a defect in a heater. Plaintiff's experts concluded that a hole in the "target wall" of the heater resulted in hot gases escaping from the combustion chamber and igniting building materials that were not properly protected by a flame resistant fire brick material.

The heater manufacturer asserted that the cause and origin expert retained by the plaintiff was not qualified to testify as to the cause of the hole in the combustion chamber and further that the product defect expert should be precluded from testifying because he did no testing.

Unfortunately for the plaintiff, the experts were unable to state any definitive theory as to what caused the original hole in the heating chamber. The experts provided no solid opinions with respect to how long the hole had been present prior to the fire. Not surprisingly, the Court of Appeals relied heavily on the lack of testing to affirm the district court's preclusion of the experts:

> Bullerdiek provided no testing or other engineering analysis to support his causation opinion. He relied on his expertise to state that the hole could cause a localized temperature rise at undefined points *inside* the heater but made no attempt to calculate where or how hot these "hot spots" would be, much less identify a known or potential error rate for his analysis. He then theorized that these unlocated and unquantified hot spots could result in a series of radiative or convective transfers of heat through the heater cabinet that eventually would reach the environment in sufficient amounts to ignite nearby combustibles. He provided no testing or mathematical analysis to quantify, even as a rough estimate, how much heat would be transferred through these processes and how it would compare to the heat necessary to ignite the combustibles. The causation problem is further complicated by Bullerdiek's opinion that the internal hole had been present during heater operation for "potentially weeks or months, even" before the fire occurred. Bullerdiek Depo. at 105. In lieu of any analysis or testing to show that the heater, after functioning perhaps for weeks with a hole in the target wall could actually ignite nearby combustibles, Bullerdiek offered only vague theorizing based upon general principles. "Where 'opinion evidence ... is connected to existing data only by the *ipse dixit* of the expert,' a district court 'may conclude that there is simply too great an analytical gap between the data and the opinion proffered.'" *Cangieter,* 462 F.3d

> at 924 (quoting *Gen. Elec. Co. v. Joiner*, 522 U.S. 136, 146, 118 S.Ct. 512, 139 L.Ed.2d 508 (1997)). Such is the case here.

Id. at 1215-1216.

The 10th Circuit Court of Appeals reached a consistent result in Truck Insurance Exchange v. MagneTek, Inc., 360 F.3d 1206 (10th Cir. 2004). The Truck Insurance case involved a theory described in the fire science literature as "pyrolysis" or "pyrophoric carbonization." The court found that pyrolysis was a novel theory which lacked solid support in the scientific community.

The theory advanced by the plaintiff was that pyrolysis causes a reduction in the initial ignition temperature of various combustible materials. While wood typically has an ignition temperature of 400° F., plaintiffs argued that long term pyrolysis lowered that temperature significantly. The plaintiff's expert provided some limited testing and information that revealed temperatures that could be generated by an allegedly defective light fixture and ballast. They then argued that these elevated temperatures caused pyrolysis of the surrounding combustible materials and led to the fire. The experts produced no tests that showed the temperatures that might result from the alleged defect in the light fixture could reach the ignition temperatures of the wood, and the court found that there was no reasonable scientific basis to accept the pyrolysis theory. Thus, the plaintiffs' experts were precluded under Daubert.

Lack of testing was also the basis to preclude an expert in Indiana Insurance Co. v. General Electric Co., 326 F.Supp.2d 844 (N.D. Ohio 2004). In that case, a fire was alleged to have originated in a General Electric refrigerator and led to a subrogation claim filed by the homeowners' insurance carrier against General Electric. The court detailed the scientific methodology set forth in NFPA 921 and noted that it was the recognized guide for assessing the reliability of opinion evidence in fire investigation cases. Plaintiffs' experts each testified that their investigations were an attempt to comply with NFPA 921. The court found otherwise.

The defense persuaded the court that the cause and origin expert for the plaintiff failed to comply with the requirements of NFPA 921 with respect to documenting and collecting physical evidence. In particular, the criticism was focused on the experts' inability to specifically match the remains of a power cord found at the fire scene to the refrigerator, when there were other electrical devices in the area of origin that could have matched up with that power cord, none of which were effectively eliminated as a match by the expert.

After precluding the cause and origin expert from testifying, the court went further and held that the plaintiff's electrical engineer could not testify either; in part because of his new inability to rely on the critical aspects of the investigation undertaken by the cause and origin expert. While the court noted that the lack of testing is not the determinative factor in ruling on Daubert issues, it was found to be "instructive." In this case, the electrical engineer performed no testing that could provide the basis for any conclusion that the fire was a result of a defect in the refrigerator. The court held that the reliance of the electrical engineer on the suspect cause and origin investigation, "together with his failure to conduct any testing, impugns reliability of his analysis." Id. at 853.

2. Experts Permitted to Testify Despite Absence of Testing.

On the other hand, many courts have rejected the notion that specific testing to recreate a disputed fire cause is always required for the admission of expert testimony. See Cummins v. Lyle Indus., 93 F.3d 362 (7th Cir. 1996) (stating "[w]e do not mean to suggest, of course, that hands-on testing is an absolute prerequisite to the admission of expert testimony). In Workman, 2005 WL 1896246 (D. Kan. 2005), the defendant argued that the plaintiff's expert should be precluded because he failed to test his theory that a wire within the freezer separated and ignited insulation causing the fire. In rejecting that position, the court stated:

> 'Independent testing is not the *sine qua non* of admissibility under Daubert." Where an expert otherwise reliably utilizes scientific

> methods to reach a conclusion, lack of independent testing may 'go to the weight, not the admissibility' of the testimony.

Workman, supra. at *10.

Several recent cases have followed those rulings, holding that full blown testing of causation and product defect issues is not required to satisfy Rule 702 requirements. In fact, not all causation or product defect testimony is the type of opinion that requires testing. See Van Den Eng v. The Coleman Co., 2006 WL 1663714 (E.D. Wis. 2006). Additionally, if an expert is properly qualified and possesses the appropriate education and experience to go along with a clear and complete detailed understanding of the properties of particular materials that he is providing testimony on, the lack of testimony is not fatal; rather, it goes to the weight of the testimony rather than its admissibility. Travelers Indemnity Co. v. Industrial Paper and Packaging Corp., 2006 WL 3864857 (E.D. Tenn. 2006).

The district court in Kansas recently ruled that testing is not a determinative factor. Instead, where an expert has not performed testing, but utilizes accepted scientific methods to reach a conclusion, the lack of such testing does not make his opinions unreliable. Windham v. Circuit City Stores, Inc., 420 F.Supp.2d 1206 (E.D. Kan. 2006). In that case, the plaintiff alleged that a fire started because of the negligent installation of a kitchen range and range cordset installed by the defendant Circuit City at the plaintiff's residence. Plaintiff's expert concluded that the cordset experienced an electrical arcing fault which led to the fire. He then concluded that the installation caused the cordset to be located in a position where it was abraded by a screw head on the back of the kitchen range. Plaintiff's expert did not conduct any tests or experiments to show that a screw head could damage the range cord insulation and lead to the electrical activity that he claimed caused the fire. The court permitted his testimony, primarily because he followed the proper methodology set forth in NFPA 921 to eliminate all other

reasonable potential causes for the fire. Such a process was recognized as a legitimate method to establish causation in a fire case. Id. at 1212-1213.

A similar result was reached in Colony Insurance Co. v. Coca Cola Co., 2007 WL 1774406 (N.D. Ga. 2007) where the court permitted plaintiff's expert to testify regarding an electrical malfunction resulting from an improperly crimped connection in a power supply located within a soda vending machine. The expert was allowed to provide limited opinions despite the absence of any testing on the amount of electrical resistance that would create heat at the crimp connection or the resulting energy that might cause a fire. The court found it significant that the electrical principles relied upon by the expert were well accepted and discussed in basic handbooks. Additionally, the expert bolstered his credibility with the court by establishing that his investigation complied with the scientific methodology set forth in NFPA 921.

Likewise, in Bitler v. A.O. Smith Corp., 400 F.3d 1227 (10th Cir. 2004), the court held that it was not necessary for plaintiff's experts to test their theory that copper sulfide particles passed through and around a mesh screen to lodge on the safety valve seat of a gas water heater, thereby causing a gas leak and subsequent explosion because the scientific phenomenon at issue was established and not novel. Id. at 1236.

The Bitler decision was issued shortly after the 10th Circuit's Decision in Truck Insurance Exchange, supra. The Court distinguished Truck Insurance Exchange because the theory in that case was "novel," whereas in Bitler:

> by contrast, plaintiff's experts propose a theory about how the accident occurred given the known science of copper sulfite particulate contamination as a cause of propane gas leaks. What distinguishes the present case is that the need for testing is not at its highest because the reliability of the science of copper sulfite contamination is not in dispute, and thus the district court did not abuse its discretion in finding that the presence of a screen did not alter the reliability of the fundamental science. Id. at 1236.

Bear in mind that Rule 703 of the Federal Rules of Evidence allows experts to rely on facts and data provided by others in formulating opinions. Rule 703 provides that:

> 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. Facts or data that are otherwise inadmissible shall not be disclosed to the jury by the proponent of the opinion or inference unless the court determines that their probative value in assisting the jury to evaluate the expert's opinion substantially outweighs their prejudicial effect.

Fed. R. EVID. 703. In forming a basis for their opinions or inferences related to their investigation, fire origin and cause investigators regularly rely on facts and data provided by electrical engineers. See, e.g., Moores v. Sunbeam Products, Inc., 425 F.Supp.2d 151, 154 (D. Me. 2006) (fire cause and origin expert sent the remains of a heating pad believed to have been the cause of the fire to an electrical engineer for inspection and analysis); see also U.S. v. Schlesinger, 372 F.Supp. 711, 716-17 (E.D. N.Y. 2005) (fire cause and origin expert hired an electrical engineer to assist in his investigation).

When an expert relies on the opinion of another, such reliance goes to the weight, not to the admissibility of the expert's opinion. Ferrara & DiMercurio v. St. Paul Mercury Ins. Co., 240 F.3d 1, 9 (1st Cir. 2001); Fed. R. Evid. 703. In fact, courts frequently have pointed to an expert's reliance on the reports of others as an indication that their testimony is reliable. See, e.g., Antoine-Tubbs v. Local 513, Air Transp. Div., 50 F.Supp.2d 601, 609 (N.D. Tex. 1998) (citing Moore v. Ashland Chem., Inc., 126 F.3d 679, 690-91 (5th Cir. 1997), rev'd en banc, 151 F.3d 269 (5th Cir. 1998) and cert. denied, 526 U.S. 1064 (1999), aff'd, 190 F.3d 537 (5th Cir. 1999)). It is now "common in technical fields for an expert to base an opinion in part on what a

different expert believes on the basis of expert knowledge not possessed by the first expert; and it is apparent from the wording of Rule 703 that there is no general requirement that the other expert testify as well." Dura Automotive Systems of Indiana, Inc. v. CTS Corp., 285 F.3d 609, 613 (7th Cir. 2002).

In fire cases, the preferred methodology is for cause and origin experts to narrow the suspected cause of a fire and then turn over the relevant evidence to specialists such as electrical and mechanical engineers to assist in confirming or denying the cause and origin expert's findings.

The situation presented to the court in Van Den Eng v. The Coleman Co., 2006 WL 1663714 (E.D. Wis. 2006) illustrates this principle. That case involved a carbon monoxide poisoning situation resulting from a propane heater manufactured by the defendant. The plaintiff presented a series of expert witnesses, none of whom specifically tested their theories with respect to product defect. Interestingly, the court noted that while none of the experts provided testing, taken collectively, and drawing upon each other's opinions and conclusions as foundations, the experts were permitted to testify to their primary opinion despite the lack of specific testing:

> Generally, the plaintiff protests what might be described as Coleman's "divide and conquer" approach to excluding these experts. For example, with respect to each expert, Coleman asserts that the individual did not perform adequate testing to backup his opinions. The plaintiff, however, states that its experts are a sort of package deal and that each is entitled to rely on the observations and experience of the others in forming his opinion. Thus, even if one expert did not perform tests sufficient to found his opinion, the information gleaned from the others, and from other sources, is fair game. For the reasons set forth below, I generally agree with the plaintiff and will not exclude any of the expert's opinions completely.

Id. at 10.

D. Lessons To Be Learned and Guidelines for Satisfying the Foundation Needed for the Admission of Expert Opinion Testimony.

Whether because of substantial issues regarding the methodology for conducting a fire investigation or the absence of appropriate testing to support an expert's opinion, courts will almost invariably preclude an expert from offering opinions that might be considered "speculative," since any such opinions are not reliable under Rule 702 and Daubert. Where those opinions do not "fit" the facts of the case they will not be permitted. Additionally, opinion testimony is often subject to exclusion where the expert cannot reasonably eliminate other potential causes of a fire. The 8th Circuit summed up these concerns in Hickerson, supra. where it noted that expert testimony should be excluded where

> too much speculation was required to make the leap from the circumstantial evidence to the conclusion that product defect existed and caused the fire. There was strong evidence to support a theory of causation different from the plaintiff's theory and the plaintiff's theory of causation was speculative and did not enjoy the support of a reliable expert's identification of a point of origin.

Id. at 1260.

Thus, for example, while the plaintiff's expert in Colony Insurance Co. v. The Coca Cola Co., supra., was able to testify regarding the effect of electrical malfunctions in a crimped connection that he believed existed in a product located in the area of origin, he could not testify that it was his opinion that the improper crimp occurred during the manufacturing process.

Another example of a "speculative" opinion being precluded by the Court is found in State Farm Fire and Casualty Co. v. Holmes Products, 165 Fed. Appx. 182, 2006 WL 228617 (3d Cir. 2006). There, the plaintiff alleged that a halogen floor lamp caused a fire when draperies hanging in the home came into contact with the allegedly defective lamp. The plaintiff argued that the lamp should have been equipped with a guard to prevent combustibles from contacting the lamp and being ignited from the heat generated by the high temperature bulb. The issue that the plaintiff's experts had to overcome was the fact that the evidence showed the lamp

was situated two feet away from the draperies. In order to bridge the gap (literally and figuratively) between the lamp and the draperies, the expert concluded that the homeowner's dog must have either knocked over the lamp or brushed past the draperies causing them to come into contact with the lamp. The Third Circuit affirmed the preclusion of the plaintiff's expert, finding that testimony with respect to the dog was speculative since it was not supported by any scientific analysis or methodology, the proposed testimony was stated in terms of possibilities without being sufficiently supported in the evidence and the expert was unable to conclusively state whether the halogen lamp fell over prior to the fire beginning.

Immediate recognition of the roadblocks that lie ahead in the presentation of experts is essential. At a minimum, in order to be in the best position to defeat Daubert arguments in fire cases, each of the following factors should be recognized, deployed and applied wherever appropriate:

A. Pre-screening of experts. Experts should be "cross-examined" concerning their credentials before being retained, to ensure that they have ample experiential and educational background in the specific subject matter of the proposed investigation.

B. Restriction of experts' activities. Resist the temptation to over-extend an expert, perhaps at the urging of the expert, beyond their specific area of expertise. Fire cause and origin experts should not address electrical or mechanical failures; engineering experts should not analyze materials or metallurgical deficiencies.

C. Identify and preserve all pertinent physical evidence. The rules of non-spoliation/preservation of evidence dictate that the instrumentality which caused the loss must be preserved, to the extent possible, in its entirety. All reasonable secondary or alternative causes which have been considered and ruled out similarly must be preserved. All "bridges" between

primary and secondary areas of damage such as fuel sources, wiring, piping, and other similar artifacts should be secured and maintained.

D. Photographic and videographic documentation. The loss site should be thoroughly documented, both from macro as well as micro perspectives, through the use of thirty-five millimeter photography, digital photography and videography. Photographs are the most effective and least expensive form of verifying site conditions, and should be used extensively in every investigation.

E. Identify and follow applicable standards. NFPA 921, Guide for Fire and Explosion Investigations, must be consulted and followed for all relevant investigative purposes. Other applicable standards, including the American Society of Testing and Materials Guideline for Collection and Preservation of Evidence and Evaluating Technical Data also should be consulted and relied upon, where appropriate.

F. Testing - in some form - should be considered in every case. The most effective testing is that which is focused on establishing a single element of proof in the theory of causation. Each hypothesis must be broken down to predicate components, and then tested independently or verified by reliance upon authoritative scientific or industry literature. Testing is not equivalent to examination but analysis and interpretation of evidentiary artifacts can be supported by reference to established industry findings, guidelines and benchmarks.

G. Utilize existing industry research. Consultants should utilize the extensive database of fire science and engineering literature which is available and which effectively can be mined for tests which may support an expert's findings in a given investigation.

H. Utilize objective, not subjective, predicate facts. The expert's analysis, wherever possible, should be grounded on specific facts yielded in the investigative process, and objective

findings resulting from testing in the scientific community at large, for the particular investigation being conducted.

I. Address potential rates or probability of error, and controls to ensure validity of findings. Every expert analysis must face up to obvious vulnerabilities in the methodology utilized, and then explained how their potential impact has been avoided or reduced to being a de-minimus factor. Counsel should focus upon the weakest - not the strongest - aspect of the expert's analysis since that will be the attack launched by an intelligent opponent.

Finally, every step of the expert's investigative process should pay attention to these three factors: the reliability of the investigative procedures used; the reasonableness of the conclusions formulated; and the ability to demonstrate, through repetitive analyses, that the investigative method and resulting opinions are scientifically valid, not speculative and worthy of being presented to the finder of fact.

The ultimate goal of any investigation is to develop reliable opinions that not only answer what caused a loss, but are admissible in court.