No. 12-0987

In the Supreme Court of Texas

Gharda USA, Inc. and Gharda Chemicals, Ltd.,
Petitioners

v.

Control Solutions, Inc., United Phosphorus, Inc. and Mark Boyd,
Respondents

On Appeal from the First District Court of Appeals,
No. 01-10-00719-CV

PETITIONERS' BRIEF ON THE MERITS

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STATEMENT OF THE CASE

Nature of the Case	Suit for property damage from fire in a chemical warehouse/processing plant allegedly caused by spontaneous combustion of chemicals stored there.
Trial Court	55th District Court, Harris County, Hon. Dion Ramos
Trial Court Disposition	Jury verdict for Plaintiff, CSI. CR 16:4417-36 (App. 2). Judgment originally entered for roughly $8 million in damages. CR 18:5055-57. Trial court then granted motion for JNOV, and entered a take-nothing judgment in favor of Gharda Defendants. CR 18:5183-84 (App. 1).
Court of Appeals	First Court of Appeals, Houston
Court of Appeals Opinion	*Control Solutions, Inc. v. Gharda USA, Inc*, 394 S.W.3d 127 (Tex. App.—Houston [1st. Dist.] Aug. 16, 2012, pet. filed) (App. 3). Majority opinion by Justice Keyes, joined by Justice Higley. Dissenting opinion by Justice Massengale.
Court of Appeals Disposition	Majority opinion reversed and remanded for entry of judgment in favor of Plaintiffs. Dissenting opinion would affirm.

STATEMENT OF JURISDICTION

This Court has jurisdiction under sections 22.001(a)(1)(dissent), 22.001(a)(2) (conflicts), and 22.001(a)(6) (importance to the jurisprudence) of the Texas Government Code.

ISSUES PRESENTED

1. Does the court of appeals opinion threaten to undermine this Court's jurisprudence on the legal sufficiency of expert causation testimony when it:

- Accepts expert causation testimony based on mere "possibilities," rather than "probabilities"?
- Credits expert testimony that damages are "consistent with" a particular causation theory, rather than requiring probative evidence of causation?
- Accepts proof of causation by process of elimination?
- Finds a causation theory to be based on legally sufficient evidence when it is based on one test, allegedly supporting one part of the causation theory, rather than requiring each part of the causation theory to be supported by testing or other scientifically reliable evidence?
- Disregards undisputed test results conducted by a defendant's experts that disprove a plaintiff's theory?

2. Did the court of appeals erroneously find legally sufficient evidence to support a theory of causation requiring proof of three dependent hypotheses, when none of those hypotheses is supported by reliable scientific evidence?

REASONS TO GRANT REVIEW

This case involves an interdependent web of unreliable expert opinions that combined to use pseudo-science and untested opinions to hijack the litigation process.

CSI's property sustained a fire and explosion that caused millions of dollars in property damage. Within two days, CSI decided to blame some drums of a chemical manufactured by Gharda, an Indian company. Gharda has a spotless track record in the industry — it sells 500 tons of this product a month and has never been accused of starting a fire or explosion, other than this suit.

CSI hired experts to prove its pre-ordained theory. Using non-scientific, backwards reasoning, reliance on each others' unsupported assumptions, and the avoidance of scientific testing, the experts pointed the finger at Gharda.

The jury bought the experts' story. The trial judge saw through it and granted a motion JNOV.

A majority of the court of appeals found that the evidence supported the jury's verdict. But to reach that result it had to disregard several bedrock principles of expert causation jurisprudence. This erroneous opinion could undermine this Court's clear directives on expert testimony about causation. It also has turned a blameless defendant into a multi-million-dollar judgment debtor.

STATEMENT OF FACTS

Plaintiff/Respondent CSI[1] buys chemicals and formulates insecticides and pesticides in a 48,000 square-foot building filled with flammable solvents and hydrocarbons. RR3:39, 51-52, 164-66. This case arises from an explosion and fire that destroyed that building. RR3:164.

Defendant/Petitioner Gharda[2] is a chemical company that, among other things, manufactures and sells the generic chemical chlorpyrifos. RR8:25-26; CR14:3766. Although Gharda sold approximately 500 tons of chlorpyrifos each month at the time of trial, Gharda had never had another complaint that its chlorpyrifos exploded or started a fire, before or after this incident. RR8:33-34.

At the time of the fire, CSI had placed 32 drums of Gharda's chlorpyrifos in an industrial oven known as a "hot box." RR4:15-16, 55; RR3:171. The hot box was toward the center southwest of the building, which had less damage from the fire than other portions of the building. RR 4:265-67, 294. After the fire, none of the lightweight caps on any of the Gharda drums had been disturbed, and none of the drums showed any sign of explosion. RR4:218-19, 268-69.

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[1] There are three Plaintiffs/Respondents: (1) CSI, which owned and operated the business in whose warehouse this fire took place; (2) United Phosphorous, Inc., which owned some materials destroyed in the fire; and (3) Mark Boyd, who owned the property and leased it to CSI. Because their interests are completely aligned in this litigation, collectively they will be referred to as "CSI," or "Plaintiff."

[2] Similarly, there are two Defendants/Petitioners: (1) Gharda Chemicals, Ltd., an international company based in India, and (2) Gharda USA, Inc., a wholly owned subsidiary of that company in the United States. Because their interests are completely aligned in this litigation, collectively they will be referred to as "Gharda" or "Defendant."

Within two days of the fire, CSI's owner had decided to blame the fire on Gharda. RR3:133-34, DX91. CSI then hired experts to confirm this theory. They first measured vapors inside the chlorpyrifos drums after the fire, and found "a high level" of the chemical toluene. RR5:187; 6:60. Based on this evidence, they concluded that toluene contamination in the drums must have caused the fire. RR5:120-21, 213.

But later, when Plaintiffs discovered that Gharda's manufacturing process could not produce toluene, the experts had to change their theory. RR5:166, 187-88. Because 8 of the 32 drums showed a "detectable level" of the chemical ethylene dichloride ("EDC"), RR5:186-87; 6:16-17, 37-38, the experts arrived at a new opinion that the fire had been caused by excess levels of EDC. RR5:166:187-88.

At trial, Plaintiffs relied principally on three expert witnesses:

(1) **Cheremisinoff**, a chemical engineer, RR:6:112-13, who opined it was "possible" that contamination of Gharda's product with excess EDC could result from Gharda's manufacturing process, but admitted that he did not know how much EDC was present and **assumed** that there was enough EDC to reach the flammability limit. RR6:163-68; 220-21.

(2) **Armstrong**, a chemist, RR5:170, who opined that the fire started by spontaneous combustion by ruling out some other possible causes inside

the hot box, but *assumed* that (1) the fire started in the hot box, and (2) the drums in question contained enough excess EDC to cause ignition. Supp. RR 5-5-2009:144-145; RR6:24-25.

(3) **Russo**, a fire investigator, RR5:13-14, who testified that the origin of the fire was the hot box, RR5:59, but relied on other experts to determine (1) the quantity of EDC, RR4:215, 219-20; 5:112-113, and (2) the cause of the fire, RR5:111-13, 137-38, 158.

Between them, these three experts conducted one "test." RR5:102, 123-25; 6:40, 151. Two weeks after the fire they placed a 3M personnel badge that absorbed vapors inside each of the 32 drums of chlorpyrifos in the hot box. RR5:44-47. They sealed the drums in overpacks (larger drums), retrieved them 17 days later, and then ran them through a device that could detect components as remote as one part per billion. RR6:42-43; RR5:44-47, 53-57, 150-51, 182-84. Although the testing device was capable of testing quantities of specific substances, Plaintiff's experts chose not to test for quantity. RR5:106; 6:23-24.

Plaintiff's experts initially concluded from the badge test that the fire was caused by the presence of toluene vapors, and that remained their opinion for two years. RR5:120-21, 186. When they learned that toluene was not present in chlorpyrifos, they abandoned that opinion and declared that the fire was caused by the presence of excessive amounts of EDC. RR5:122, 187, 212-15; 6:26-27. Yet

the fire investigator admitted that, without measuring the quantity of EDC, no one could tell (1) how much EDC was present, (2) whether it constituted contamination, (3) whether it was a sufficient quantity to cause any reaction, or (4) whether it was a sufficient quantity to be flammable. RR5:111-13, 138-40, 156-57.

Additionally, CSI's experts admitted that the vapors detected in the test could have come from a number of sources, including the decomposition of the chlorpyrifos, byproducts of the fire, or the surrounding air in the industrialized area of Pasadena, near the Houston Ship Channel, where CSI's warehouse was located. RR5:100, 104; 6:20, 41-42, 44-45.

Finally, Plaintiff's experts identified two drums in the hot box as being the source of the ignition, and the badge test revealed that those two drums contained no source of EDC whatsoever. RR5:116-26, 141; 6:16-17, 37-38, 69-70, 98, 152, 164-65.

Nevertheless, armed with this single inconclusive test and a plethora of assumptions and speculations, Plaintiff's experts reached the same result that CSI's owner initially assumed: that the fire was caused by the drums containing Gharda's chlorpyrifos. The jury believed them. CR16:4420-23 (App. 2). However, the trial judge, after letting Plaintiffs put on all the testimony that they had, realized that it amounted to nothing. He granted a JNOV based on legally insufficient evidence of causation. CR18:5183-84 (App. 1).

On appeal, the panel majority voted to reverse, finding the expert testimony on causation to be legally sufficient. (App. 3). Justice Massengale disagreed and wrote a thorough dissent explaining why the JNOV was warranted and should have been affirmed. (*Id*. at 171-85.)

SUMMARY OF ARGUMENT

The majority opinion of the court of appeals attempts to re-write this Court's book on the requirements for expert causation testimony, particularly in fire cases.

- It suggests that expert causation testimony can be based on "possibilities," rather than "probabilities."
- It credits expert testimony that damages are "consistent with" a particular causation theory, rather than requiring probative evidence of causation.
- It accepts proof of causation by process of elimination.
- It finds the testimony of three experts relying on one dubious test result to be legally sufficient evidence of causation, rather than requiring each part of the causation theory to be supported by testing or other reliable scientific evidence.
- It disregards undisputed test results conducted by Defendant's experts that disprove Plaintiff's theory.

Each of these holdings is contrary to this Court's jurisprudence regarding expert testimony of causation.

The causation theory cobbled together by Plaintiff's experts depends on proof of three dependent hypotheses regarding (1) contamination, (2) fire ignition, and (3) fire origin. Each of those hypotheses must be proved by legally sufficient and scientifically reliable evidence for the causation theory to survive. Yet none is

supported by any scientifically reliable evidence. Therefore, the jury's finding of causation is not supported by legally sufficient evidence and the trial court's JNOV was appropriate. The court of appeals judgment should be reversed, and judgment rendered in favor of Gharda.

ARGUMENT

I. The majority opinion of the court of appeals undermines this Court's expert causation jurisprudence.

A. This Court has diligently required that expert causation testimony be based on reliable scientific evidence, not just the subjective opinion of the expert.

One of the most significant changes in Texas civil litigation over the past half-century has been the dramatic proliferation of expert witness testimony. In some ways this has been a positive development, when experts have assisted juries to have a deeper knowledge and better understanding of complex scientific and technical matters. But the increased availability of professional expert witnesses also has the potential to cause confusion and distortion, as skilled advocates are able to substitute expert qualifications and unsupported opinions for reliable scientific evidence and analysis. *See Whirlpool Corp. v. Camacho*, 298 S.W.3d 631, 639 (Tex. 2009) (citing *Gammill v. Jack Williams Chevrolet, Inc.*, 972 S.W.2d 713, 722 (Tex. 1998)) ("If courts merely accept 'experience' as a substitute for proof that an expert's opinions are reliable and then only examine the testimony for analytical gaps in the expert's logic and opinions, an expert can effectively insulate his or her conclusions from meaningful review by filling gaps in the testimony with almost any type of data or subjective opinions.").

This Court has been aware of that potential for abuse, and for the last two decades has been diligent at every turn to require that expert testimony be based on reliable scientific evidence, *see, e.g. E.I du Pont de Nemours v. Robinson & Co.*, 923 S.W.2d 549, 556 (Tex. 1995); *Merrell Dow Pharms., Inc. v. Havner*, 953 S.W.2d 706, 712-13 (Tex. 1997), and not merely the *ipse dixit* of the expert, *Gammill*, 972 S.W.2d at 726-27; *Burrow v. Arce*, 997 S.W.2d 229, 235 (Tex.1999).

This Court has subjected expert testimony on causation to particular scrutiny, consistently rejecting attempts to impose liability based a loose correlation between two events or a vague causal link. These efforts have taken several forms. Among other things, this Court has held that:

- Testimony about causation cannot be based on a mere "possibility," but must be based on reasonable probability. *Mack Trucks, Inc. v. Tamez*, 206 S.W.3d 572, 582-83 (Tex. 2006); *Gen. Motors Corp. v. Iracheta*, 161 S.W.3d 462, 471-72 (Tex. 2005).
- Testimony about causation cannot be based on damages being merely "consistent with" a causation theory. *Tamez*, 206 S.W.2d at 580.
- Testimony about causation cannot be based on the process of elimination. *Cooper Tire & Rubber Co. v. Mendez*, 204 S.W.3d 797, 807-08 (Tex. 2006).

- Testimony about a theory of causation requires that all parts of an expert's theory be supported by scientifically reliable testing. *Whirlpool Corp. v. Camacho*, 298 S.W.3d 631, 642 (Tex. 2009); *see Volkswagen of Am., Inc. v. Ramirez*, 159 S.W.3d 897, 905-06 (Tex. 2004).
- Appellate review of testimony about causation cannot disregard undisputed testing by opposing experts. *See Whirlpool*, 298 S.W.3d at 640-42.

B. The majority opinion undermines this Court's efforts to set a high standard for expert causation testimony.

Despite this Court's jurisprudence subjecting expert testimony on causation to high scrutiny, the majority opinion of the court of appeals creates a roadmap for dodging those cases. In so doing, it makes law that undermines the expert-causation opinions of this Court.

1. The majority opinion undermines this Court's holdings that expert causation opinions must be based on probability, and not mere possibility.

This Court has been clear that causation testimony must be based on probability, not mere possibility. *See Tamez*, 206 S.W.3d at 583 ("testimony that the battery or its cable could possibly have ignited . . . is not evidence that it probably did so. . . . As proof of what caused the fire, such evidence is speculative and is insufficient to prevent summary judgment."); *Iracheta*, 161 S.W.3d at 472 ("the mere possibility that the rear hose was compromised at impact is not enough to support the jury's findings.").

Nevertheless, the majority opinion credited the expert opinion of Cheremisinoff, based on a mere "possibility" that the product was defective rather than requiring a probability**.** *See* Section II.A.4, *infra* (quoting passage from record where Cheremisinoff used the phrase "realm of probability," but immediately clarified that he could only testify to a "possibility."). The majority opinion acknowledges the argument that Cheremisinoff "testified in terms of possibilities," but does not confront the argument, noting merely that Cheremisinoff *testified* that he "used generally accepted scientific principles relating to proper testing methods to support his conclusions." *Control Solutions, Inc. v. Gharda USA, Inc*, 394 S.W.3d 127, 159 (Tex. App.—Houston [1st Dist.] Aug. 16, 2012, pet. filed). The majority then flipped the burden of proof, faulting Gharda for failing to show that Cheremisinoff's testimony was *un*reliable.

2. The majority opinion undermines this Court's holdings that expert opinions on causation must be based on more than damages being merely "consistent with" a causation theory.

This Court has been clear about requiring causation testimony to be based on more than simply facts being "consistent with" an expert's causation theory. *Tamez*, 206 S.W.3d at 580 (facts merely "consistent with" an expert's causation theory "are not probative evidence"), 584 (evidence merely consistent with a causation theory "does not make it more likely than not" that the theory is valid).

Nevertheless, the majority opinion's discussion of Russo's testimony twice refers to statements that the damages are "consistent with" his theory of causation. *Control Solutions*, 394 S.W.3d at 147. Based on mere consistency, the majority opinion concludes that Russo's testimony is reliable. *Id.* at 150-51.

3. The majority opinion undermines this Court's holdings that expert opinions on causation must be based on more than the process of elimination.

This Court has been clear about requiring expert causation testimony to establish a direct causal link rather than merely applying a process of elimination. *Cooper Tire*, 204 S.W.3d at 807-08 ("The universe of possible causes . . . is simply too large and too uncertain to allow an expert to prove a manufacturing defect merely by the process of elimination."). As Justice Massengale wrote in his dissent, the process of elimination has been rejected "as an analytical shortcut to avoid the rigors of actual scientific analysis," *Control Solutions*, 394 S.W.3d at 180 (Massengale, J., dissenting) (citing *Mendez*, 204 S.W.3d at 807-08), and has been "scathingly criticized in the context of developing a reliable opinion about the cause of a fire." *Id* (citing 5 David L. Faigman et al., *Modern Scientific Evidence: The Law and Science of Expert Testimony* § 39:65, at 291 (2011-2012 ed.)).

Nevertheless, the majority accepts expert opinions reached largely through the process of elimination. *See, e.g.*, *Control Solutions*, 394 S.W.3d at 150.

4. The majority opinion undermines this Court's holdings that all aspects of an expert's causation theory must be tested.

This Court has held that "each material part of an expert's theory must be reliable," *Whirlpool*, 298 S.W.2d at 637, and that testing should support "all the various and critical parts of [the expert's] opinion." *Id.* at 642. In cases where expert's utilized some testing, but could not point to scientifically reliable testing for each step in their analysis, this Court has found no evidence of causation. *Volkswagen*, 159 S.W.2d at 905-06; 911-12.

Nevertheless, the majority opinion accepted a causation theory cobbled together by three experts who, between them, conducted only one "test" — a measurement that addressed only a part of one step in their three-step causation theory. *See generally, Control Solutions*, 394 S.W.3d at 159.

Instead of requiring testing, the majority accepted an expert's statement that "investigating the origin of a fire is not readily subject to testing," and "depends to some extent on the experience and subjective interpretation of the investigator." *Id.*, 394 S.W.3d at 150. This Court has held that there are very few cases where expert opinions can be based on the expert's experience alone without being supported by scientific testing and authorities, and has specifically rejected the argument that experience could substitute for testing in a fire causation case. *See Whirlpool*, 298 S.W.3d at 638-40.

5. The majority opinion undermines this Court's holdings that undisputed evidence of testing by a defendant's experts must be considered when reviewing the sufficiency of causation evidence.

This Court has held that uncontested testing conducted by a defendant's experts must be considered in analyzing the legal sufficiency of testimony by a plaintiff's experts. *See Whirlpool*, 298 S.W.2d at 640-42.

Nevertheless, the majority disregarded uncontested testing that disproved plaintiff's causation theory. *Compare Control Solutions*, 394 S.W.3d at 144-64 (purporting to describe all relevant evidence, but failing to include any discussion of the tests performed by Gharda's experts) *with* RR8:151-55; 9:31-32, 140-72 (descriptions of testing by Gharda's experts); *see also Control Solutions*, 394 S.W.3d at 181-82 (Massengale, J., dissenting).

Each of these mis-statements and distortions of the law by the majority, if allowed to escape this Court's review, creates a roadmap for future litigants and courts to evade an important area of this Court's expert causation jurisprudence. Taken together, they present a compelling reason to grant this petition.

II. The expert testimony about the cause of the fire was legally insufficient because it was not based on scientifically reliable evidence.

The causation theory of CSI's experts required that three necessary hypotheses to be proved:

- **Hypothesis 1: Contamination with excess EDC.** In the manufacturing process, Gharda's product was contaminated with excess levels of the chemical EDC.
- **Hypothesis 2: Ignition or spontaneous combustion.** When the drums were heated in the hot box at CSI's facility, excessive amounts of EDC caused the product to degrade and produce vapors that either were ignited by ionized dust or spontaneously combusted.
- **Hypothesis 3: Fire origin.** The fire originated in the hot box when the ignition of vapors caused a low-level explosion that blew open the hot box doors, resulting in the spread of the fire outside of the hot box.

If CSI failed to prove any one of these hypotheses by reliable expert testimony, then no evidence supported CSI's causation theory. None of these three hypotheses was proved by testing or any other reliable basis.

A. CSI's contamination hypothesis was not supported by reliable evidence.

Starting two days after the fire, CSI sought to blame the fire on some contaminant in Gharda's product. *See* RR3:133-34, DX91. When its retained experts measured vapors in the chlorpyrifos drums weeks after the fire, they found "a high level" of the flammable chemical toluene. RR5:187; 6:60. They concluded that toluene contamination in the drums must have caused the fire. RR5:120-21,

213. But later, when CSI's experts discovered that Gharda's manufacturing process could not produce toluene, they changed their theory. RR5:166, 187-88. Because 8 of the 32 drums also showed a "detectable level" of the chemical EDC, RR5:186-87; 6:16-17, 37-38, the experts arrived at a new opinion that the fire had been caused by excess levels of EDC. RR5:166,187-88.

This abrupt shift in the expert's causation theories to fit CSI's litigation theory underscores the unreliability of their conclusion. Rather than establish their theory with key indicia of reliability, such as testing, the experts improperly reasoned from the fire backwards to try to find a theory that would make Gharda liable. This ultimately led to their untested theory that the "detectable level" of EDC in some drums must mean that it was the cause of the fire. This is exactly the sort of unreliable methodology that this Court has repeatedly rejected.

1. CSI was required to prove that the quantity of EDC in the product was excessive.

The first step in CSI's theory that EDC contamination caused the fire is proving that the drums contained an excessive amount of EDC. Proving that there were merely "detectable levels" of EDC in the drums was not sufficient.

EDC is used in the manufacturing of chlorpyrifos. RR 8:85. The specifications for chlorpyrifos permit it to contain some EDC when it is sold, because small quantities of EDC pose no risk of fire. Even CSI's experts testified that levels of at least 1.2 to 1.4% EDC in chlorpyrifos would be required to reach

the lower limit of flammability. RR5:112; RR6:164. Thus, unless the experts could prove an amount of at least 1.2 to 1.4% EDC in Gharda's product, they could not prove their causation theory.

CSI's fire investigator admitted that **he could not say with reasonable probability that EDC was the cause without knowing the *quantity* of EDC**. RR5:112, 156-57. This was an admission that reliable evidence of the quantity of EDC was necessary to establish causation.

2. No tests or other reliable evidence demonstrated that the quantity of EDC was excessive.

CSI never proved that the quantity of EDC in Gharda's product was greater than 1.2%. CSI performed no tests to determine the quantity of EDC in the drums, before or after the fire. RR6:21-23. The only test or measurement they performed was the badge-test measurement of vapors, which found only "detectable" levels of EDC in only 8 of the 32 drums. RR5:186-88; 6:16-17, 37-38. None of CSI's experts could testify that the level of EDC in any drum was more than a "detectable level." *See, e.g.*, RR5:104-09, 152, 186-87 (noting that there was a "lot of toluene" but only "detectable levels" of EDC).

A "detectable level" meant only that the quantity of EDC could be as small as **one part per billion**. RR 6:162-63. This is far less than the 1.2% (more than one part per **hundred**) that EDC experts said was necessary for EDC to be flammable.

RR6:164; 5:112. In other words, this test proved an amount that was less than 1/10,000,000 of the amount necessary for EDC to be flammable.

CSI's chemistry expert Armstrong testified that EDC was present in some of the drums, but could not opine on the amount. RR5:187-88; 6:21, 23-24. CSI's chemical-engineer expert Cheremisinoff, reasoning backwards, "*assume*[*d*]" that there was 6 percent EDC vapor in the hot box because that was the amount necessary to become flammable. RR6:224-25. **But he admitted that the quantity of EDC in the drums cannot be determined based on available information**. RR6:163, 168.

CSI has suggested that the presence of EDC in some drums after the fire might prove that the level before the fire was excessive. Response to PFR at 14, 23. But its own experts' testimony demonstrates otherwise. Although Armstrong testified that it was "remarkable and a little strange" that they found EDC in any drums post-fire, both Armstrong and Cheremisinoff admitted that the presence of some EDC after the fire does not prove a contaminated amount pre-fire. RR6:46-47, 161-62. Rather, as CSI's expert Russo explained, these chemicals found in the drums after the fire could be (1) "residue [from the] virgin product," (2) chemicals that the drums were "exposed to during the fire," or (3) chemicals resulting from atmosphere exposure for 13 days after the fire. RR5:100, 104; 151-52. Armstrong admitted the same thing. RR6:20, 41-42, 44-45. He further explained that when a

drum goes through a fire, the material inside is consumed, the drum cools, and it creates a vacuum that draws in materials from the environment. RR 6:96. No expert could testify that the presence of EDC **after** the fire was the result of excessive levels of EDC **before** the fire, as opposed to contamination from the atmosphere after the fire.

The flaw in the expert's reasoning process is demonstrated by their initial opinions about toluene. The badge test found a "high level" of toluene. RR5:187; 6:60. So CSI's chief expert Russo first reasoned that an excess quantity of toluene in Gharda's product must have caused the fire. RR5:120-21, 213. But when CSI's attorneys learned through discovery that Gharda's manufacturing process made toluene contamination impossible, they sought another way to blame Gharda. RR5:187-88, 214; RR6:9.

But how, then, did the experts explain the high levels of toluene found after the fire? They claimed that toluene could have been produced by the fire, or it could have come from the atmosphere. RR5:162-63; 6:20. Yet the experts failed to account for the possibility of chemicals in the atmosphere when analyzing post-fire detectable levels of EDC. This faulty reasoning is result-oriented, and designed to find some defect in Gharda's product.

CSI cited no tests or other scientific support to prove that the presence of detectable levels of EDC after the fire had any relation to the quantity of EDC

before the fire. As the dissent noted, no tests were conducted to determine whether the post-fire badge-testing method could reliably detect excessive levels of EDC before the fire. 394 S.W.3d at 181 (Massengale, J., dissenting). And there was no "control" badge test to determine whether EDC was present in the ambient air in the area. *Id*. at 182. CSI's experts could offer no testing, no reasoning, and no other evidence that the post-fire finding of detectable levels of EDC in eight drums proved that the pre-fire level of EDC in Gharda's product was excessive.

Additionally, even if CSI had proven that there had been an excessive amount of EDC in 8 of the 32 drums, this would not have proven an excess amount in the two drums where it claimed the fire started. Importantly, CSI's experts could not detect any EDC in the two drums that CSI's fire-origin experts had identified as the source of the fire. RR6:16-17, 37-38. Thus, thus the experts' theory rests on an inference that the presence of detectable levels of EDC in other drums somehow means that there was an excessive pre-fire level of EDC in the two drums in question, which contained no trace of EDC after the fire. That inference is inherently unreliable. As Armstrong admitted, the fact that one drum is contaminated does not mean that the other drums in the same batch were contaminated. RR6:38.

In short, there is no scientifically reliable proof of EDC levels exceeding the threshold level required for flammability or explosivity.

3. The lack of testing shows the unreliability of CSI's theory.

Courts have called the testing requirement the "most significant *Daubert* factor." *Garcia v. BRK Brands, Inc.*, 266 F. Supp. 2d 566, 574 (S.D. Tex. 2003) (citing cases). And this Court has placed particular emphasis on testing to support a fire-causation theory. *See Whirlpool*, 298 S.W.3d at 639-42; *Tamez*, 206, S.W.3d at 580-81; *Iracheta*, 161 S.W.3d at 468-69.

The majority opinion glossed over this and other holes in the causation theory offered by CSI's experts, mistakenly reasoning that they were merely fact issues for the jury because they concern "the propriety of the conclusions that a juror could have drawn . . . ." 394 S.W.3d at 158. But, in a legal sufficiency review, it is the role of the court — not the jury — to determine initially whether an expert's conclusion is based on flawed reasoning or methodology. *See Havner*, 953 S.W.2d at 714.

CSI's experts could have tested for the quantity of EDC for other drums from the same shipment because Gharda kept samples — known as "retains" — of the batch of chlorpyrifos it had sold to CSI. RR9:7, 23. In fact, Gharda's experts did test those retains, and the tests showed that the batches shipped to CSI had EDC levels ranging from 0 to 0.034%. RR9:25. This was well below the 1.2% that CSI's expert had said was necessary to cause a fire. RR6:163.

CSI also recovered two unburned drums of chlorpyrifos from the same shipment as the drums in the hot box. RR6:96-97. Although CSI's experts could have tested them for levels of EDC, they chose not to. RR6:100. This omission is particularly puzzling, especially since CSI's experts base their conclusion on:

- post-fire testing that showed merely a detectable level of EDC, even though the experts admitted that the level could have been either (1) byproducts of the fire or (2) the result of 17 days of exposure to the atmosphere after the fire, RR5:100, 104; 6:20, 41-42, 44-45; and
- an inference from a finding of detectable levels of EDC in 8 of 32 burned drums to a conclusion that the two drums where they claimed the fire started must have had an *excessive* level of EDC, even though those two drums showed no *detectable* level post-fire, RR6:16-17, 37-38.

Given the willingness of CSI's experts to extrapolate from the contents of one drum to another, they could have tested their hypothesis by determining the precise quantity of EDC in the "virgin" drums that CSI had been sold, but that had not been exposed to fire or the atmosphere. But they chose not to.

In short, the causation opinions of CSI's experts are unreliable because they conducted no tests whatsoever to show that Gharda ever sold to CSI chlorpyrifos with EDC amounts exceeding the 1.2% threshold that their own experts said was necessary to cause a fire.

4. CSI's experts proved no more than the "possibility" of excess EDC — not the "probability" of excess EDC.

Gharda established that its manufacturing process is designed to ensure a level of EDC in chlorpyrifos of less than 0.1%. RR9:61-63. Gharda's tests showed that the retains had an EDC level of 0.024%. RR9:25. Both are far less than the level that CSI's experts said was the minimum threshold for flammability — 1.2 to 1.4%. RR6:163-64.

CSI's countered this evidence with the opinion of Cheremisinoff, who testified that it was "possible" that the amount of EDC in particular drums varied, and that some drums could contain more than 0.1%. He testified that, because Gharda relied on humans to monitor the level of EDC, there was a possibility of human error. RR6:130.

> Q. You don't have any evidence that any of that happened here, do you?
>
> A. That's right, I don't. All I can say is that is within the realm of probability because of the way the process is run. It's run labor intensive.
>
> Q. That it's likely that this is going to happen?
>
> A. It's possible it will happen.
>
> Q. Possible?
>
> A. Yes.

RR6:220-21. In other words, Cheremisinoff clarified that he could testify only that it was "possible" that a drum contained excess levels of EDC capable of igniting and causing a fire. This is nothing more than an observation of the universal truth that human error is possible. It is not an explanation of likelihood or probability in this case.

Cheremisinoff's testimony is no evidence of excess amounts of EDC because it relies on nothing more than "possibility, speculation, and surmise." *Havner*, 953 S.W.2d at 712; *see also Tamez*, 206 S.W.3d at 583; *Iracheta*, 161 S.W.3d at 472. He never visited the Gharda plant, RR6:171, and could not testify to any actual contamination of actual Gharda products with excess amounts of EDC. RR6:163, 168.

5. CSI's argument for excess EDC improperly rests on elimination of some other possible causes for the fire.

Although no expert testified that the amount of EDC exceeded 1.2%, the best articulation of CSI's theory shows that it is based on an inference of an amount exceeding 1.2% based on the elimination of alternate causes. CSI has argued that "something was wrong with the product" because: (1) one expert opined that the fire originated in the hot box, which contained only chlorphyrifos drums; (2) another expert found no electrical or mechanical malfunction; (3) another expert opined that chlorphyrifos combined with sufficient EDC could ignite; and (4) yet another expert concluded that, at Gharda's manufacturing

facility, EDC contamination was possible, although he could not say it was "probable." Response to PFR at 3, 6; RR6:220. Thus, while none of CSI's experts proved that there was a sufficient amount of EDC to start a fire, CSI asks this Court to simply infer that critical fact based on the elimination of some other possible causes.

CSI's inference-by-elimination is inherently unreliable. This Court consistently has held that the elimination of other causes cannot provide a shortcut to proving a manufacturing defect or the steps in a fire-causation theory. As this Court reasoned in a tire-failure case, the universe of possible causes "is simply too large and too uncertain to allow an expert to prove a manufacturing defect merely by the process of elimination." *Cooper Tire*, 204 S.W.3d at 807-08.

The problem with the process of elimination is demonstrated by the experts' process here. Initially, they blamed the fire on excess toluene, without even considering EDC as a possible cause. *See* RR3:133-34, DX91. It was only when CSI discovered that toluene was not created in Gharda's manufacturing process, that its experts simply changed their theory and identified EDC as a new culprit. *See* RR5:166, 187-88. CSI's approach demonstrates that they were not considering all possible causes — only the ones most convenient for blaming Gharda. This is litigation-oriented reasoning with a pre-ordained conclusion — where there's a fire, there must be a defect. *See Robinson*, 923 S.W.2d at 559 ("[O]pinions formed

solely for the purpose of testifying are more likely to be biased toward a particular result.")

B. CSI's ignition theories were not supported by testing or other reliable evidence.

Even if a drum had contained excess EDC, a second, necessary step in CSI's causation theory was to prove how **this** fire was ignited. CSI's experts struggled to explain any theory of **how** the EDC could have been ignited. They ultimately offered multiple possibilities, and in some instances contradicted each other. Their ignition theories were unreliable for many of the same reasons as their contamination theories. Each theory was no more than "possible." The only support for the theories was the elimination of other possible causes. And no theory was tested.

1. CSI's experts offered conflicting ignition theories, which were no more than "possible."

CSI's experts attempted to use the process of elimination to rule out various ignition theories, but they ultimately arrived at various, conflicting theories among themselves.

CSI's chemical engineer expert Cheremisinoff, after ruling out other various possible ignition sources inside the hot box, concluded that there was a "possibility" that EDC was ignited by a static charge from ionized dust particles. RR6:153-54, 196-99. In contrast, CSI's chemical fire expert, Armstrong, ruled out

a static charge ignition and other possible causes, and therefore concluded that the only remaining possible cause was spontaneous combustion. RR6:27-30. And CSI's fire origin investigator, Russo also used the process of elimination to arrive at a conclusion that the cause was "auto ignition" or "spontaneous combustion." RR5:206-07, 215-16.

In other words, one expert ruled out all causes except a static charge from dust particles, and two other experts ruled out all causes except spontaneous combustion. In another fire-ignition case, this Court noted "[t]he difficulty is that there are significant conflicts in and between the testimony of" the plaintiff's experts on conflicting theories of ignition and held that the conflict between their testimony was "fatal" to the plaintiff's claim. *Iracheta*, 161 S.W.3d at 465, 470. The same problem exists here.

2. CSI's ignition theories improperly rest on elimination of some other possible sources of ignition.

Even if the ignition theories of CSI's experts were consistent, they pointed to no more than possibilities that they then supported by eliminating other possible causes that they had identified. Cheremisinoff emphasized that his static-discharge theory was a "possibility" and explained that he reached it by ruling out seven other possibilities. RR6:153-54, 196-99. Armstrong and Russo both narrowed three possible causes down to one, spontaneous combustion. RR6:27-30; RR5:215-16.

As previously discussed, problems abound when ruling out possible causes to reason backwards to a product defect. *Supra* at 25-27. This problem is particularly acute in fire cases, where this type of reasoning is inherently speculative, inconsistent with the Scientific Method, and generates un-testable hypotheses and incorrect determinations of ignition sources and the first fuel ignited:

> The process of determining the ignition source for a fire, by eliminating all ignition sources found, known, or believed to have been present in the area of origin, and then claiming such methodology is proof of an ignition source for which there is no evidence of its existence, is referred to by some investigators as "negative corpus." Negative corpus has typically been used in classifying fires as incendiary, although the process has also been used to characterize fires classified as accidental. This process is not consistent with the Scientific Method, is inappropriate, and should not be used because it generates un-testable hypotheses, and may result in incorrect determinations of the ignition source and first fuel ignited. Any hypothesis formulated for the causal factors (e.g., first fuel, ignition source, and ignition sequence), must be based on facts. Those facts are derived from evidence, observations, calculations, experiments, and the laws of science. Speculative information cannot be included in the analysis.

5 David L. Faigman *et al.*, *Modern Scientific Evidence* § 39:65.

The "negative corpus" reasoning here was even more flawed because the expert did not consider all possible causes, but based their starting set of possibilities on particular assumptions. This is demonstrated by Armstrong's testimony at the *Daubert* hearing:

Q: [N]o one was able to identify any source of the ignition within the hotbox, were they?

A: That is correct, to my knowledge, no one can specifically identify a component of the hotbox that would cause ignition.

Q: And so since no one knows of any component to cause ignition to the hotbox, you came to the conclusion it had to be spontaneous because there's no source of ignition, right?

A: Well, one of the premises of investigation is if you eliminate all other sources, it has to be the one that's left, so yes.

. . . .

Q: [R]eally what you did was reverse engineer because you took the idea it had to be in the hotbox because that's what these fire and origin guys say; and so if the only thing is in there, then it has to be the chlorpyrifos, right?

A: That's — except for the reverse engineering, that's very logical.

Q: And then if there's no source of ignition in there, then, well, it's just got to just self-ignite, right?

A: Yes, sir, that is — the logic follows very nicely. I like your logic.

Supp. RR(5-5-2009):143-44.

This "process of elimination" is not reliable proof of any theory of ignition because it relies on the elimination of causes that are based only on assumptions. CSI's experts based their starting set of possible ignition sources on and underlying assumption that the fire started in the hot box — the least damaged part of the building. They did not even consider ignition sources from other locations in CSI's

facilities. And the experts further assumed that the drums of chlorpyrifos were contaminated with excess levels of EDC. *See, e.g.*, RR6:23-24, 144, 153. This ignition theory would be no more reliable had the experts simply started with the assumption that Gharda was liable for the fire.

3. CSI's ignition theories were not supported by testing.

CSI produced no reliable evidence, such as actual testing, to support any of its expert's ignition theories.

For instance, CSI's experts performed no tests to support their theory that vapors from a solid mixture of chlorphyrifos and EDC would ignite at any level of concentration. RR5:126. Nor could the experts cite any literature or studies supporting the assumption that vapors from a mixture of chlorpyrifos and EDC can self-combust or explode. RR5:125-26; *see Robinson*, 923 S.W.2d at 557.

Instead, the experts asked the court and jury to simply trust their *ipse dixit*: "I'm not aware of any testing. I know EDC will catch on fire and I know toluene will catch on fire. And if you have the right ratios, you can get you a fire and explosion out of either one, but not testing." RR5:126.

In contrast, Gharda's experts **did** test the flammability of the vapors from different mixtures of chlorpyrifos and EDC. They found that a mixture with 10% EDC would not explode, even with a flame applied to the mouth of the beaker.

RR8:139-40. They found that a 20% EDC mixture ignited, but the flame disappeared within a few seconds. RR8:140-41.

But it was impossible for the drums to contain a concentration of even 10 or 20% EDC because, with as little as 10% EDC in the mixture, 60% of the drum would have turned from solid to liquid. RR8:150. Yet the undisputed evidence from CSI's own employees was that the product in these drums was solid and hard. RR4:19-23, 44-45, 47. The failure to account for this fact renders the experts' methodology unreliable. *See Volkswagen*, 159 S.W.3d at 911-12.

One of CSI's experts complained that Gharda's testing did not replicate the accumulation of gas in a whole room because an exhaust fan "might" have been on elsewhere in the room. RR8:159-61. But this test did measure whether fumes would catch fire when directly exposed to a flame. RR8:140. In light of this undisputed evidence, CSI's experts should have conducted tests, not only to counter Gharda's test, but to support their own ignition and spontaneous combustion theories. CSI could have tested key parts of its theory:

- What percentage of EDC in the mixture can result in spontaneous combustion?
- What percentage of EDC in the mixture can be ignited by ionized dust, or any other ignition source?

- Is it possible for any flammable mixture of chlorpyrifos and EDC to be solid at room temperature, as CSI's own employees observed?

None of these tests were performed.

In *Whirlpool*, this Court held that a fire causation expert's experience could not substitute for testing in determining the cause of a fire. *Whirlpool*, 298 S.W.3d at 638-640. The Court found no reliable support for an expert's fire causation theory where "the only test on which he founded his theory about how the fire was started in the dryer drum by ignited lint particles did not support all the various and critical parts of his opinion." *Id*. at 642. Here, *no* part of CSI's ignition theory was tested, even though their experts admitted, and Gharda's testing showed, that testing *was* possible. *See, e.g*., RR6:23-24, 94-95. Yet it was CSI, not Gharda, who had the burden to prove that its ignition theory was reliable. *Whirlpool*, 298 S.W.3d at 639.

"If testing of critical aspects of an expert's testimony has not taken place," then the evidence must explain why it is not "an important consideration in evaluating the expert opinions and determining whether they are substantively more than merely the expert's conclusory, subjective opinion." *Id*. at 642-43. Here, the evidence did not demonstrate that testing was not important. Instead, the experts simply told the jury that they knew EDC would ignite.

C. CSI's fire-origin theory was not supported by testing or other reliable evidence.

The third step in CSI's causation theory is the opinion that the fire started in the hot box. The other steps in CSI's theory — the contamination theory and the ignition theory — both rely on process-of-elimination theories that assume the fire started in the hot box. So, unless CSI proved with reliable evidence that the fires started in the hot box, the other steps in its theory necessarily collapse.

1. CSI failed to prove its fire-origin theory had a reliable basis.

CSI failed to meet its burden to prove a reliable basis for its fire-origin theory. *See Robinson*, 923 S.W.2d at 556. The fire-origin experts, Russo and Rice, claimed to use a methodology known as NFPA 921. RR5:27; 4:238. But CSI did not introduce NFPA 921 as evidence at trial or make it part of the appellate record. *Control Solutions, Inc.*, 394 S.W.3d at 172 (Massengale, J., dissenting). Thus, the jury had to rely on the experts' *ipse dixit* for the requirements of that methodology and their assertion that they correctly followed it.

2. CSI's fire-origin theory is unreliable because of the lack of testing.

Although NFPA 921 was not in evidence, CSI's experts admitted some requirements of that standard, and reported case law establishes other requirements. CSI failed to prove that Russo and Rice met those requirements in a number of respects, most notably the lack of testing.

CSI cites Russo's reliance on NFPA 921 as an explanation for failing to test Russo's theories. But, as various authorities establish, a proper application of NFPA 921 actually **requires** testing. *See, e.g., Fireman's Fund Ins. Co. v. Canon U.S.A., Inc.*, 394 F.3d 1054, 1058 (8th Cir. 2005) ("*NFPA 921* requires that hypotheses of fire origin must be carefully examined against empirical data obtained from fire scene analysis and appropriate testing."); *Royal Ins. Co. of Am. v. Joseph Daniel Constr., Inc.*, 208 F.Supp.2d 423, 426 (S.D.N.Y. 2002) ("The NFPA 921 sets forth professional standards for fire and explosion investigations and provides a six step process in which an investigator must: (1) recognize that a need exists to determine what caused the fire; (2) define the problem; (3) collect data; (4) analyze the data; (5) develop a hypothesis based on the data; and (6) test the hypothesis.").

Because Russo did not test

his hypothesis, he did not follow the methodology of NFPA 921. Neither Russo nor any other CSI expert did testing to determine that there was an explosion in the hot box. RR4:270. And they did no testing to determine whether excess levels of EDC can lead to a "low-order" explosion of the type he hypothesized. They did no testing to determine the forces that an explosion would have placed on the doors, sides, top, bottom, or vent of the hot box to see whether

it could blow open the doors without damaging the other parts of the box. RR5:143-44; 6:151.

3. CSI's fire-origin theory violated the requirements of NFPA 921 in other respects.

CSI's two fire-origin experts failed to meet NFPA 921 in other ways:

(1) Rice agreed that NFPA 921 requires investigators to approach a fire without presumptions as to the origin, ignition sequence, cause, fire spread or responsibility for the fire. RR 4:239-41. It also counsels investigators against reaching a premature conclusion too early in a study without having examined and considered all relevant data.

Yet Rice focused his efforts on the hot box and did not adequately investigate causes outside it. He had been told by CSI employees and others that the fire may have begun in the hot box, so he focused much of his two 45-minute inspections of the property on the hot box and never returned. RR4:252-57; RR 10:71-74. Although Rice admitted that most fires begin at the lowest point in the area of most burn, he did not inspect the areas of the most burn because he did not have access to them. RR4:259-60, 265. Instead, he spent much of his time in the hot box, which was the area of the least burn. RR4:265. His opinion, reached after only 90 minutes of inspections of only part of the property, and based on no tests whatsoever, was a premature conclusion without considering all relevant data.

(2) Rice did not eliminate alternate causes. Although Rice acknowledged that electrical outlets are a well-recognized cause of fires, he never ruled them out and did not have access to many of them. RR4:294-97. And although Rice's theory was based on his observation that an explosion opened the doors of the hot box, he never eliminated the possibility that firemen opened those doors. RR4:298-99.

(3) Fire expert Russo's opinion rested on a foundation that has been discredited in the scientific community. His fire-origin theory was based in part on a "V" burn pattern on the wall behind the hot box. This theory has been discredited as a basis for determining fire origin. 5 David L. Faigman *et al*., *Modern Scientific Evidence* § 39:13; *see also* Report of the Texas Forensic Science Commission: Willingham/Willis Investigation, at 14 (2011)[3] ("In the early 1990's, many fire investigators based their conclusions of origin in part on the theory that a "V-pattern" on a wall points to the origin of the fire. Scientists now know that the "V-pattern" simply points to where something was burning at some stage of the fire, not necessarily the origin.").

(4) Although Russo admitted that NFPA 921 directs investigators to interview witnesses, he chose to interview only CSI employees and not the firemen who fought the fire because he "did not want to influence them and have them

[3] Available at http://www.fsc.state.tx.us/documents/FINAL.pdf.

predetermine something out of context because of our conversation." RR 5:30, 93-94.

4. CSI's fire-origin theory could not reliably explain undisputed facts.

To support their theory that the fire was caused by Gharda's product in the hot box, CSI's experts had to try to explain away some inconvenient facts:

(1) The hot box was located toward the center southwest of the building, which had less damage than other areas. RR4:265-67, 294. Russo admitted in deposition testimony that the area of the hot box had the least amount of fire damage, although he suggested at trial that another area between the hot box and forklift had less. RR 5:136. Yet as Russo and Rice admitted, NFPA 921 counsels an investigator to pick as an origin the location of the greatest burn because fire burns up and out. RR 5:67-68; 4:265-66.

(2) Despite CSI's theory that the drums had exploded, none of the drums showed signs of explosion and each drum's cap remained in place. RR4:218, 268. Similarly, although an explosion inside the hot box should have occurred in the box's weakest spot, which was the vent, the vent showed no signs of damage. RR 3:274-75; 4:275-77, 289, 308-09.

Given these facts that were highly problematic to his origin theory, Russo hypothesized that there was a "very low order" explosion, rather than an ordinary explosion; that the low-order explosion from within the hot box created a low-

pressure force that blew open the hot box doors and lifted the roof; and that the low-order explosion inside the hot box ignited materials outside the hot box. RR5:31-32, 131-34. Yet Russo gives no credible explanation for how the explosion could be strong enough to blow open the doors and lift the roof without blowing off the drum caps or damaging the vent, which was the box's weakest spot.

(3) A key part of this fire-origin theory was the fact that the locked hot box doors were found open by an expert the day after the accident. RR4:218-19. Russo saw this as proof that the doors blew open. But CSI failed to eliminate other possible causes of the open doors. For instance, a number of firefighters had entered the building on the day of the fire. RR4:298. CSI's experts did not know whether the doors had been opened by firefighters while they were fighting the fire. RR4:298. CSI could not rule out alternate explanations for this key step in their ignition theory.

Like the other steps in CSI's causation theory, its fire-origin theory is supported only by its experts' subjective interpretations and opinions, not testing or other *Daubert/Robinson* factors. "[A] claim will not stand or fall on the mere *ipse dixit* of a credentialed witness." *Jelinek v. Casas*, 328 S.W.3d 526, 536 (Tex. 2010); *City of San Antonio v. Pollock*, 284 S.W.3d 809, 818 (Tex. 2009).

D. Because each expert's opinion was conditional and stacked upon one another, each opinion was unreliable.

The majority opinion also failed to consider the interrelatedness of these opinions. In essence, CSI's theory was a circular chain with the expert opinions for each step relying on assumptions based on the other unreliable expert opinions. CSI's causation case, as described by the dissent, consisted of "one conditional opinion stacked upon another stacked upon another. . . ." 394 S.W.3d at 184 (Massengale, J., dissenting).

This is how these conditional opinions rely on each other:

- Cheremisinoff opined that contamination with excess EDC was a "possible" result of human error in Gharda's facilities, but admitted that he did not know how much EDC was present and **assumed** that there was enough EDC to reach the flammability limit. RR6:163-68; 220-21.
- Armstrong opined that the fire started by spontaneous combustion by ruling out some other possible causes inside the hot box, but **assumed** that (1) the fire started in the hot box, and (2) the drums in question contained enough EDC to cause ignition. Supp. RR 5-5-2009:144-145; RR6:24-25.
- Russo, and to a lesser extent, fire marshal Rice, opined that the fire began in the hot box, but could not testify as to the cause of the fire or whether the product was contaminated with an excess quantity of EDC. RR4:215, 219-

20; 5:136-39. Instead, Russo **relied on Armstrong** for an opinion of how the fire could have started. RR5:137-38.

There are several consequences of these interdependent opinions. First, if any one step in the experts' theory does not have reliable support, the entire chain collapses. This is why CSI was required to show reliable support for each of the three steps in their theory.

Second, the logic of the entire set of opinions is circular. Each expert assumes and relies on the truth of the other expert's opinions in reaching their own opinions.

Third, although each expert reached their opinions based on a suspect "negative corpus" method of ruling out alternate causes, they refused to consider alternate causes that conflicted with other experts' assumptions. For instance, as the dissent explained:

> Were there alternate possible causes such that it is more likely that the chlorpyrifos did not degrade and ignite the fire? Dr. Armstrong was relieved from this inquiry by simply assuming that the correct location of the fire had been identified and confining his analysis to the restricted universe of factors existing inside the hot box, one of which had to be the cause under his assumed scenario.

394 S.W.3d at 184 (Massengale, J., dissenting). Similarly, Cheremisinoff opined that human error was possible in Gharda's manufacturing process, beginning with the assumption that the level of EDC was excessive. RR6:163-68, 220-21. He did not consider the possibility that the level of EDC was not excessive. An expert's

failure to explain or disprove alternate theories makes his or her own theory speculative and conclusory. *Wal-Mart Stores, Inc. v. Merrell*, 313 S.W.3d 837, 840 (Tex. 2010) (per curiam) (*citing Iracheta*, 161 S.W.3d at 470).

Finally, the entire chain is a classic example of a result-oriented process designed to reach a particular conclusion in litigation. *See Robinson*, 923 S.W.2d at 559. CSI decided within days after the fire that it was Gharda's fault and hired experts to prove each step of its theory.

E. All steps in CSI's causation theory rely on expert testimony unsupported by the *Robinson* factors.

Although we have highlighted the most unreliable aspects of the three steps in CSI's causation theory, it is helpful to step back to see whether the body of CSI's causation opinions is supported by the six non-exclusive *Robinson* factors:

> 1. the extent to which the theory has been or can be tested;
>
> 2. the extent to which the technique relies upon the subjective interpretation of the expert;
>
> 3 whether the theory has been subjected to peer review and/or publication;
>
> 4. the technique's potential rate of error;
>
> 5. whether the underlying theory or technique has been generally accepted as valid by the relevant scientific community; and
>
> 6. the non-judicial uses which have been made of the theory or technique.

Cooper Tire, 204 S.W.3d at 801 (citing *Robinson*, 923 S.W.2d at 557).

Testing. Apart from the test that found detectable levels of EDC in some drums, the experts' theories were not tested, even though a number of aspects of their theories could have been tested — and, in some instances, were tested and disproved by Gharda's experts. Although experts admitted they could have tested certain aspects of their theory, such as the quantity of EDC in the post-fire drums, as well as the quantity of EDC in drums from the same batch that CSI did not put in the hot box, they chose not to. RR5:106; 6:23-24, 96-97.

Subjective interpretation / non-judicial uses. This case involves a classic made-for-litigation theory, which is more likely to be biased toward a particular result. *Robinson*, 923 S.W.2d at 549. CSI first decided that Gharda's product caused the fire, and then hired experts to prove it. *See* RR3:133-34, DX91. Each step of the theory relied on the experts' subjective interpretation of the data they chose to consider. *See, e.g.*, RR5:126 ("I'm not aware of any testing. I know EDC will catch on fire. . . . ").

Publication and peer review / rate of error / general acceptance. There was no peer review. These experts did not publish their theories. And there was no proof of any rate of error for any of their methods.

Not only did these opinions have serious flaws that demonstrate their unreliability, most of the opinions were unsupported by any of the *Robinson* factors. They were unreliable and no evidence of causation.

PRAYER FOR RELIEF

Petitioner Gharda respectfully requests this Court grant its petition for review, reverse the judgment of the court of appeals, and reinstate the trial court's take-nothing judgment.

Respectfully submitted,

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CERTIFICATE OF SERVICE

On October 23, 2013, I electronically filed this Petition for Review with the Clerk of Court using the CaseFileXpress electronic filing system which will send notification of such filing to the following (except where alternate service is otherwise noted):

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CERTIFICATE OF COMPLIANCE

Based on a word count run in Microsoft Word 2007, this petitioner's brief contains 9,565 words, excluding the portions of the brief exempt from the word count under Texas Rule of Appellate Procedure 9.4(i)(1).

/s/Kevin Dubose
Kevin Dubose

No. 12-0987

In the Supreme Court of Texas

Gharda USA, Inc. and Gharda Chemicals, Ltd.
Petitioners,
v.
Control Solutions, Inc., United Phosphorus, Inc. and Mark Boyd,
and their Subrogated Insurers Hiscox and Amlin Plc.
Respondents.

On Petition for Review from the First Court of Appeals
No. 01-10-00719-CV

Respondents' Brief on the Merits

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Identity of Additional Parties

Additional Respondents: Subrogated Insurers Hiscox Plc. and Amlin Plc.[1]

[1] The court of appeals held that CSI's subrogated insurers had no standing to appeal because they were not included in the pleadings and no evidence was admitted at the jury trial of the subrogation right. *Control Solutions, Inc. v. Gharda*, 394 S.W.3d 127, fn. 1 (Tex. App. – Houston [1st Dist.] 2012, pet. filed). However, evidence of subrogation is a matter of law for the trial court, and the subrogation right was presented and preserved through pre-trial and post-trial summary judgment motions. *Yeary v. Hinojosa*, 307 S.W.2d 325, 334 (Tex. 1957).

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Statement of the Case

Nature of the Case.	Respondents sued manufacturer Gharda Chemicals, Ltd., and distributor Gharda USA, Inc., for damages arising out of an explosion and fire that destroyed the CSI warehouse and office building in Pasadena, Texas.
Trial Court judge.	Hon. Dion Ramos, 55th Judicial District Court of Harris County, Texas.
Jury Findings and Award.	The case was tried to a jury from February 10-25, 2010. The jury found both petitioners negligent, Gharda liable for manufacturing defect, and Gharda USA liable for inadequate warning, assigning as fault: CSI 0%; Gharda USA 10%; Gharda Chemical 90%, and awarding overall damages of $8.37 million.
Trial Court Disposition.	Final judgment was entered May 20, 2010. Several months later, the trial court granted amended JNOV motions finding CSI's expert testimony unreliable and legally insufficient to support the verdict.
Court of Appeals Disposition.	The First Court of Appeals reversed with instructions to reinstate the jury verdict. The majority opinion, authored by Justice Evelyn V. Keyes and joined by Justice Laura Carter Higley, held that CSI's expert opinions were reliable and legally sufficient to support the verdict. Justice Michael C. Massengale dissented on grounds that the experts did insufficient testing. *See Control Solutions, Inc. v. Gharda USA, Inc. and Gharda Chemicals, Ltd.*, 394 S.W.3d 127 (Tex. App. – Houston [1st Dist.] 2012, pet. filed). Gharda's motions for rehearing and *en banc* reconsideration were overruled.

Statement of Jurisdiction

There is no jurisdiction over this appeal. The court of appeals did not commit an error of substantive law, or if it did, the error was not of such importance to the jurisprudence of the state that it requires correction. Tex. Gov't Code §22.001(a)(6).

Petitioners failed to identify decisions of the court of appeals or this Court that this case supposedly conflicts with under Tex. Gov't Code §22.001(a)(2), and the court of appeals opinion creates no inconsistency or uncertainty in the jurisprudence regarding the reliability of expert testimony that requires clarification.

Response to Issues

1. The trial court improperly rendered JNOV that CSI take nothing based on post-verdict rejection of CSI's experts' trial testimony; CSI's experts drew reasonable conclusions from the physical evidence, performed reasonable testing, applied valid scientific methodology, and rationally connected their opinions to the underlying data.

2. The court of appeals correctly reversed the JNOV reinstating the jury's verdict in favor of CSI, applying established law and sound reasoning in analyzing each expert opinion for reliability; the expert opinions are not novel or untested but grounded in evidence, experience, and science, with no analytical gaps between the facts and opinions.

3. Petitioners' criticisms of CSI's experts' opinions are based on mischaracterization of existing law and if accepted would result in unreachable standards for admissibility of expert opinions on fire cause and origin.

1. Statement of Facts

***The Fire at CSI's Warehouse*.**

Control Solutions, Inc. (CSI), is a Texas company that formulates chemical products for industrial, agricultural and pesticide use.[2] CSI's production building and offices in Pasadena, Texas were destroyed by fire in March 2004.[3] CSI's distribution manager, Robert Blair, arrived at 5:00 a.m. the morning of the fire. He was checking orders in the distribution building when he heard a loud "boom," followed about 30 seconds later by a fire alarm. Blair went outside, and saw black smoke and flames coming from exhaust fans on the southwest corner of the production building. The Pasadena Fire Department responded, but was unable to control the fire, which spread throughout the production warehouse and offices, eventually burning itself out in the late afternoon.[4]

Four investigators from the Harris County fire marshal's office responded to investigate the fire's origin and cause.[5] Lead investigator Harold Rice testified that the investigators interviewed witnesses, observed the fire scene evidence, including fire and burn patterns, and concluded that the fire had originated in the

[2] 3 RR 51-52, 59-60; 24 RR 2A.
[3] 3 RR 199.
[4] 4 RR 68-74, 71-75, 139, 148.
[5] 14 RR Tab 19, p. 00020 (fire marshal's report).

"hotbox."[6] The hotbox is an industrial oven used to melt chemicals from solid form to liquid so that they can be blended with diluents to make various products.[7]

Burn patterns showed that the fire originated in the hotbox and traveled outwards. The hotbox itself showed evidence of an explosion: the doors were found open with the locking mechanism in a closed position and forcibly bent outwards; the doors were bowed from inside to outside; the door hinges were bent out; the rear of the box was bowed out and distended 4-6 inches, and; there was a sag in the hotbox roof due to extreme heat of extended fire.[8]

Inside the hotbox were 32 drums of chemical, some heavily burned, and burn patterns showing a hot fire in some areas. CSI representatives confirmed the hotbox was the only electrical device running in the building when employees left the previous evening. The investigators concluded the probable cause of the fire was a build up of ignitable vapors in the box and an unknown ignition source.[9]

[6] 4 RR 226-28.
[7] 3 RR 59, 171; 24 RR 2C, 2E.
[8] 4 RR 221-222, 227-228, 245, 298-300, 306; 3 RR 198; 24 RR 2UU, 2X, 2Y.
[9] 4 RR 245; 3 RR 198; 14 RR Tab 19, p. 23.

The Suspect Product from Gharda.

The only material in the hotbox at the time of the fire was 32 drums of solid chemical chlorpyrifos, manufactured by Gharda Chemicals in India, and sold by Gharda USA, Inc. (GUSA) to CSI.[10] GUSA is a wholly-owned subsidiary of Gharda. CSI ordered 40,000 pounds of chlorpyrifos from GUSA the month before the fire.[11] Gharda representatives testified the chlorpyrifos drums were filled and sealed with tamper-proof seals at Gharda's manufacturing facility in India, stored in a locked storeroom, and shipped by container to a warehouse in Missouri. At the warehouse, the drums were palletized and shipped to the customer. Sixty-four drums, weighing 625 pounds each, were delivered to CSI on March 5, 2004, and were counted and inspected per CSI's routine procedure, and found undamaged, with all seals intact.[12]

The afternoon before the fire, CSI employees moved eight pallets of the chlorpyrifos to the hotbox, cut off the wrap, inspected the drums for holes, leaks or other problems, and recorded the lot numbers. After checking to make sure

[10] 4 RR 15-16. (Gharda and GUSA are referred to as "Gharda" unless noted).
[11] 8 RR 29, 49.
[12] 8 RR 64-65; 10 RR 14-18; 24 RR 2I(seal); 3 RR 185-188.

the hotbox was empty and clear of debris, the bung seals were removed, and 32 of the 64 drums were loaded into the hotbox.

The production supervisor shut and latched the hotbox and turned it on, setting the temperature to 180°F. The vice president of operations checked the box before leaving at 10:00 p.m. that evening, confirmed the temperature was set to 180°F, and noted the box was operating normally. The distribution manager arrived at 5:00 a.m., and was in the distribution building about fifteen minutes before he heard a big "boom" followed by a fire alarm.[13]

The Fire Investigation.

A certified fire and explosion expert, specializing in chemical fires, confirmed the fire marshal's conclusion that the hotbox damage evidenced an interior explosion that blew the doors open, and that fire and burn patterns led away from the box to the rest of the building. Mechanical and electrical malfunction of the box was tested and ruled out.[14] Only Gharda chlorpyrifos was in the box, and the same melting procedure had been used for several years without incident. Something was different this time.

[13] 3 RR 195-198, 211-213; 4 RR 11-15, 18, 73.
[14] 5 RR 13-19, 36-41; 9 RR 226-234.

Some of the drums, numbers 2, 3 and 4, burned hotter than the others – a phenomenon known as "differential burning." This was inconsistent with the with the claim that all drums contained uniform product. The side of the box where those drums were located showed evidence of the greatest burn.[15] Based on the evidence, the fire expert concluded that the fire originated in the hotbox, that the probable cause was build up of an unknown ignitable vapor from the drums inside the box, and ignition of the vapor. He recommended testing of the fire debris in the drums.[16]

Testing by the Forensic Chemist.

The product in the drums was damaged in the fire, so Armstrong Forensic Laboratories recommended a standard ASTM test of the drum vapor space using charcoal strips to identify ignitable liquids. The test identified significant levels of certain ignitable liquids, ethylene dichloride (EDC) and toluene. EDC was identified as a solvent used during the Gharda manufacturing process, supposedly removed before packaging.[17] Gharda's Material Safety Data Sheet (MSDS) listed trace "inert" ingredients, but did not disclose that EDC, a flammable solvent, was one of

[15] 5 RR 44, 80-84; 24 RR 2V, 2HH.
[16] 5 RR 68-72, 80-86, 112, 137, 159-161.
[17] 5 RR 176-178, 182-184, 187; 6 RR 38, 85.

those ingredients. EDC was found in the vapor space of only eight drums of the chlorpyrifos, a supposedly homogenous batch product. Chlorpyrifos made to specification would not cause such a fire.[18]

Chlorpyrifos is an exothermic product. This means it generate heat as it decomposes. Gharda's internal documents show rapid decomposition at 158°F, contrary to the MSDS Gharda gave to customers, which listed 266°F as the decomposition temperature. The decomposition products are flammable, and a contaminant like EDC will cause faster decomposition, and more heat and vapor generation. Armstrong's opinion was that the build-up of decomposition vapors in the hotbox spontaneously combusted, igniting the flammable decomposition products and the EDC.[19]

Manufacture of "Off Spec" Product.

Gharda was contacted immediately after the fire when it became apparent that its product was the only thing in the box. Gharda took the position that it was "impossible" for chlorpyrifos to start a fire, or to be manufactured "off spec" with contaminants.[20] Because the product was shipped sealed from the Gharda plant, a

[18] 6 RR 16, 38, 45-46, 101.
[19] 5 RR 189-195, 205-207, 215-217; 6 RR 73, 85-86.
[20] 3 RR 90.

chemical engineer process expert reviewed Gharda's manufacturing and quality control processes.

The expert determined it is scientifically probable that contamination occurred at the plant because EDC is used in copious amounts during the manufacturing process, and is removed by an operator using his judgment and reading gauges, leaving room for error. Gharda's quality control testing would not necessarily catch contaminants because only five or six of thirty drums from a lot are sampled, and the minute quantities sampled are mixed together, diluting any impurity, and failing to account for stratification of product that occurs when a contaminant is present.[21]

2. Summary of the Argument

Determining a fire's cause and origin often carries serious consequences, from civil liability to criminal conviction. It is not surprising, therefore, that standards and methods have developed for investigating and determining fire cause and origin. These standards and methods were followed to the letter by CSI's experts in determining the cause and origin of the fire that destroyed CSI's warehouse.

[21] 6 RR 130-31, 136-140; 8 RR 92-94, 109-114.

In *E.I. du Pont de Nemours & Co. v. Robinson*, the Court established a non-exclusive list of factors that trial courts should consider when determining the admissibility of expert testimony. Gharda's fundamental thesis is that every one of these factors should be applied in every case in a wooden, inflexible manner. But this approach is prohibited by case law and common sense, as it would often result in injustice. Indeed, the courts have repeatedly held that the *Robinson* factors should be applied flexibly as appropriate to the circumstances – not every factor is logically appropriate for or applicable to every case.

CSI's experts included an independent fire marshal, a well-qualified fire investigator, an electrical engineer, a chemist, and an expert in chemical process engineering and quality control. Their qualifications are not at issue. Based on accepted fire-investigation methodology, the experts opined that the fire originated in the hotbox, which contained nothing other than Gharda's product delivered immediately before the fire. CSI had been buying and melting Gharda's product in the hotbox for years with no problems until the fire originated in this new batch. CSI's expert chemist tested the remains of the product and found evidence of a flammable chemical, EDC, in some of the drums but not others, and evidence of a fire that burned hotter in some drums that others, showing a non-

uniform, contaminated, defective product. The chemist relied on Gharda's literature, industry literature, and basic laws of chemistry to determine to a reasonable degree of scientific probability that the contaminated product prematurely decomposed, self-heated, and produced flammable gases that self-ignited.

CSI's chemical engineering expert analyzed Gharda's processes for manufacturing, sampling, and testing the product and determined that flaws in those processes led to the subject batch being contaminated and defective. In addition to careful examination of the physical evidence, chemical testing, and application of industry information and basic laws of chemistry, CSI's experts also considered and ruled out other causes such as electrical malfunctions and alternative points of origin.

With its attack on CSI's experts, Gharda demands full-scale testing and duplication of every aspect of a fire. This purported methodology has never been required in the private sector or by the courts, and it is neither safe nor practical. Instead of making the use of experts more efficient and reliable, Gharda's approach would prohibit experts from relying on each other and require "super-experts" qualified in multiple disciplines. This approach would only dilute true

expertise and decrease reliability. Gharda rejects the long-recognized value of consistency between evidence and theory of cause and effect by deeming it "mere consistency" no matter how much correlation is shown. But while the law dismisses consistency that is mere coincidence, consistency that bolsters an expert's conclusion is a bed rock of the scientific method. Gharda even minimizes the value of eliminating alternative causes as a key part of determining fire origin, contrary to the Court's repeated instruction that experts should address alternative theories of causation that have a plausible basis.

Gharda advocates for a system that defies existing law and common sense and creates a standard that would make proof of fire origin and cause all but impossible. It would discount the value of cross-examination and juries' ability to weigh conflicting evidence, and jeopardize litigants' right to a jury trial, as guaranteed by the Seventh Amendment of the United States Constitution. The Court should reject this mechanical application of the *Robinson* factors.

3. Argument and Authorities

Part A of this Brief discusses CSI's experts' opinions and their bases and why they met the prevailing standards for admissibility. Part B demonstrates Gharda's mischaracterization of existing law and explains how the standards advocated by

Gharda would, if accepted, result in unreachable standards for admissibility of expert opinions on fire cause and origin.

A. The court of appeals applied the correct standards in reviewing and reversing the trial court's JNOV against CSI and reinstating the jury's verdict in CSI's favor.

1. The standard for review of JNOVs is legal sufficiency of the evidence supporting the verdict.

When reviewing a court of appeals' reversal of a trial court's JNOV, this Court conducts a legal-sufficiency analysis of the evidence, reviewing the evidence presented at trial in the light most favorable to the jury's verdict, crediting evidence favorable to that party if reasonable jurors could, and disregarding contrary evidence unless reasonable jurors could not. *Ingram v. Deere*, 288 S.W.3d 886, 893 (Tex. 2009). When more than a scintilla of competent evidence exists to support the jury's findings, the reviewing court should reverse a JNOV. *Mancorp, Inc. v. Culpepper*, 802 S.W.2d 226, 228 (Tex.1990).

2. The standards for admissibility of expert opinion.

This Court has identified six non-exclusive factors that trial courts may consider in determining whether expert testimony is reliable:

(1) The extent to which the theory has been or can be tested;

(2) The extent to which the technique relies upon the subjective interpretation of the expert;

(3) whether the theory has been subjected to peer review and/or publication;

(4) The technique's potential rate of error;

(5) whether the underlying theory or technique has been generally accepted as valid by the relevant scientific community; and

(6) The non-judicial uses which have been made of the theory or technique.

Cooper Tire & Rubber Co. v. Mendez, 204 S.W.3d 797, 801 (Tex. 2006) (citing *E.I. du Pont de Nemours & Co. v. Robinson*, 923 S.W.2d 549, 556-57 (Tex.1995)).

a. The test for admissibility of expert opinion is flexible and depends on the type of case and particular facts and issues.

This Court has emphasized that the foregoing *Robinson* factors are not exclusive and do not fit every scenario. *TXI Transp. Co. v. Hughes*, 306 S.W.3d 230, 235 (Tex. 2010) (citing *Gammill v. Jack Williams Chevrolet, Inc.*, 972 S.W.2d 713 (Tex. 1998). This Court and the Texas courts of appeal have repeatedly emphasized that the pertinent, suggested inquiries in assessing the reliability of expert testimony are applied flexibly and are not exclusive or required. *See*, *e.g.*, *Coastal Tankships, U.S.A., Inc. v. Anderson*, 87 S.W.3d 591, 598-600 (Tex.App. –

Houston [1st Dist.] 2002, writ denied) (citing *Daubert v. Merrell Dow Pharms, Inc.*, 509 U.S. 579, 593-94, 113 S.Ct. 2786, 2797, and *Robinson*, 923 S.W.2d at 557). Trial courts may make other inquiries, instead of or in addition to those noted in *Daubert* and *Robinson*, that are germane to an expert's qualifications and field of expertise in determining the reliability of the proffered evidence, and the methods of proving reliability will vary, depending upon the field of expertise. 87 S.W.3d at 599. The factors a trial court will find helpful in determining whether the underlying theories and techniques of the proffered evidence are scientifically reliable will differ with each particular case. *Robinson*, 923 S.W.2d at 557. Thus, rulings on the reliability of proffered expert testimony are necessarily case-specific. *Coastal Tankships*, 87 S.W.3d at 599 n. 14; *see also Ford Motor Co. v. Ledesma*, 242 S.W.3d 32,39 (Tex. 2007) (holding that *Robinson* factors are particularly hard to apply in accident reconstruction testimony). Rather than focusing entirely on the objective basis of the underlying technique used to generate the challenged opinion, as in *Robinson*, it is appropriate in some cases to analyze whether the expert's opinion actually fits the facts of the case. *Hughes*, 306 S.W.3d at 235 (citing *Ramirez*, 159 S.W.3d at 904-05). CSI's experts' opinions fit the facts of this case from several different angles.

3. The fire origin experts employed recognized, reliable methods in concluding that the fire originated with an explosion in the hotbox.

Gharda characterizes CSI's evidence that the fire started in the hotbox as the "third-step" in CSI's causation case – apparently in an effort to minimize its importance. But the origin of the fire in the hotbox is actually the crucial first step in the analysis, because the hotbox contained nothing but Gharda's freshly-delivered product. Two well-qualified witnesses - Harold Rice and Sammy Russo - testified that the fire began in the hotbox.

a. Harold Rice - Independent Fire Marshal

Harold Rice was the lead investigator of this fire for the Harris County Fire Marshal's Office.[22] Rice testified that based on his investigation, a buildup of ignitable vapor occurred inside the hotbox that then caused an explosion and fire in CSI's building.[23]

Rice is certified through the National Association of Arson Investigators as a Certified Fire and Explosion Investigator. He has been certified through the Texas Commission on Fire Protection, as arson investigator, advanced, fire inspector, basic, fire device instructor, intermediate, and firefighter, intermediate.[24] He has

[22] At the time of the fire, Rice was the lead investigator for the Harris County Fire Marshal's office. At the time of trial, he was the deputy fire marshal with the city of Pasadena. 4RR 194 l. 13 – 24.
[23] 4RR 219 l. 9 to p. 220 l. 3.
[24] 4RR 202 l. 17 to p. 204 l. 6.

testified in court as a fire investigator and been accepted by courts as an expert in that field. He has taught arson investigation at the College of the Mainland. When he investigated this fire, Rice had been investigating fires for at least five years, and had investigated hundreds of fires, some of which involved explosions.[25] Rice was an independent, unpaid third-party witness with the expertise to evaluate the physical evidence.

Rice opined that the fire started with an explosion in the hotbox. This opinion was based, in part, on the bending and bowing and distension of the hotbox locks, doors, and hinges. Rice's opinion was rationally tied to that evidence, and the jury was entitled to credit it.

The admissibility of Rice's opinion is supported by this Court's opinion in the *Ford Motor Co. v. Ledesma* case. In *Ford Motor Co.*, this Court found that the plaintiff's expert, a metallurgist/engineer, offered a plausible theory of how a truck accident was caused by failure of bolt securing the truck's axle. The expert based his testimony on observations and measurements of tangible truck components, which were documented with photographs and videotape. The Court reasoned that although the defendant-manufacturer presented a strong

[25] 4RR 206 l. 10 to p. 208 l. 8.

defense, "ultimately the jury rejected it," and complaints about plaintiff's expert's testimony went to its weight, not its admissibility. 242 S.W.3d at 39-41. Similarly, in the *TXI Transp. Co. v. Hughes* case, this Court found that an accident reconstruction expert's observations and measurements were tied to the physical evidence and supported his conclusions and theory. 306 S.W.3d at 236-240.

b. Salvador Russo - Fire Investigator

CSI's fire origin expert was Salvador (Sammy) Russo, a fire investigation instructor for the Harris County and Texas Fire Marshal's Office, the ATF, and the International Association of Arson Investigators. He teaches cause and origin investigation for the DOT, NTSB, and Chemical Safety Board, has conducted over a thousand fire and explosion investigations over 30 years, and specializes in chemical fires. He has testified in federal court for the ATF and the State of Texas as an expert on fire origin and cause, and for the FBI in marine cargo thefts involving identification of trace level compounds.[26]

Russo followed standard fire investigation guidelines in NFPA 921, which is the recognized scientific method for cause and origin investigation. His opinion was that the physical evidence showed a low-order explosion within the hotbox

[26] 5 RR 14-17.

from an ignitable vapor, with fire then spreading away from the hotbox.[27]

i. Physical evidence showing origin in the hotbox.

Russo inspected the warehouse and hotbox approximately nine days after the fire, interviewed CSI personnel, viewed helicopter news footage, and gathered information about the chemical properties of the materials in the building and where they were located.[28] His opinion that the fire started in the southwest quadrant of the building, in the hotbox, was based on the following:

- Helicopter news video footage taken early in the fire showed a glow from the metal roof on the southwest quadrant, the firemen putting water there, a compromised ridge vent above that area, and evidence of heat on the southwest side of the building;[29]

- Firemen entering the door in the northwest quadrant reported fire off to their right, which was the southwest quadrant and hotbox area;[30]

- Fire patterns led away from the hotbox, and there were no patterns coming toward the hotbox. Flammable pallets of paper on the floor near the hotbox were unburned and would have been consumed if the fire came toward the box. There was a small hotbox next to the large hotbox with heavy carbon on the side facing the large hotbox, but no other fire damage.[31]

- Damage to the box was consistent with a low-order explosion and flash fire: the doors and hinges appeared "blown" or pushed open from the inside

[27] 5 RR 27, 72, 86.
[28] 5 RR 28-30, 96.
[29] 5 RR 34-37.
[30] 4 RR 135-138, 157-159, 165-167; 13 RR Tab 7-F.
[31] 5 RR 84.

even though they were latched, the latch and hinges were forcibly bent, the doors were warped outward, there was sheet metal separation and a bulge in the box walls, and there was distortion of the roof above the hotbox typical of gas vapor explosions. The box was the only item beneath the bulged roof. There was heavy burning on the face of a roof metal beam directly above the hotbox.[32]

- Firemen interviewed stated that they did not open the hotbox doors.[33]

- Drums 2, 3 and 4 showed very hot burning, different from the other drums, with significant evidence of heat release and carbon damage. There was differential burning on the inside of the box doors and under the box roof, particularly on the left side near drums 3 and 4.[34]

- Fire spread appeared to move outward from the hotbox area and the southwest quadrant, toward the northwest side of the building, which held numerous combustible solvents and chemicals and did not begin burning until several hours into the fire.[35]

- The Harris County fire marshals used NFPA 921 methodology.[36] They reported the building was found locked, and firefighters had to force their way in, ruling out an intruder starting the fire.[37]

ii. Evidence pointing to fire origin from vapors coming from the drums.

Russo testified that the hotbox damage, the sprung door latches, bent hinges and bowing of the walls, are consistent with low-order gas explosion

[32] 5 RR 36-41, 58-68, 73-75, 79-80.
[33] 4 RR 245, 298-300.
[34] 5 RR 80-82, 111.
[35] 5 RR 63-65.
[36] 4 RR 203-208, 238, 290.
[37] 4 RR 245, 298-300.

damage, which is also consistent with the "boom" heard by a CSI employee just before the fire alarms went off.[38] Since the only thing in the box was chlorpyrifos, he believed that either something was wrong with the box, or the product, to cause the explosion.

In order to rule out external ignition causes, Russo recommended that a qualified engineer inspect the hotbox for mechanical or electrical malfunction. Expert Roger Owen, an electrical engineer and expert in fire causation, conducted the investigation, which included removing and inspecting electrical boxes and wiring, and a fan in the hotbox. Mechanical or electrical malfunction was ruled out based upon Owen's inspection. Owen's testimony was not disputed, and was offered during Gharda's case.[39]

Pictures of the left side of the hotbox show pronounced differential burning in the area of drums 3 and 4, where the fire burned the hottest. The differential burning is evidence of something different about the materials in those drums; "coking" from very hot burning of the material only happened to two or three drums.[40] CSI reported that the product was uniform, but the fire evidence and

[38] 5 RR 68-72.
[39] 5 RR 36, 48-52; 9 RR 226-234.
[40] 5 RR 80-81.

differential burning suggested otherwise, so Russo recommended testing the drums.

Russo contacted forensic chemist Andy Armstrong, a Ph.D. chemist who runs a state-certified laboratory. There was no undamaged product left in the drums to test post-fire, so it was Armstrong's task to determine what was in the drums before the blaze. CSI's and Gharda's investigators developed an agreed testing protocol calling for a standard ASTM test of the drum vapor space. This is achieved by placing 3M charcoal badges inside the drums to test the vapor space. The drums with the badges are then placed in overpacks (larger sealed drums). The badges passively absorb chemicals that can be identified by mass spectrometer analysis, which identifies relative distribution of compounds, although the test does not quantify amount.[41]

Russo relied upon Dr. Armstrong's testing of the badges, which detected the presence of toluene and EDC in some of the drums. Both are flammable solvents, and either can cause an explosion and fire if present in a sufficient amount. The badge testing showed that the material in the drums was not uniform.[42] Toluene is a by-product of burning and was later ruled out as a possible

[41] 5 RR 44-47, 54-57, 103-105.
[42] 5 RR 53-58, 112, 126.

contaminant. On the other hand, EDC is not a by-product of fire, and Armstrong testified that there is no other mechanism or reaction during a fire that creates EDC. It was discovered that EDC was used in high quantities by Gharda to produce Chlorpyrifos.

Russo's opinion, to a reasonable degree of scientific certainty, was that an ignitable vapor from the drums caused the fire, and the vapor was probably EDC.[43] This opinion was based on abundant evidence, including the fact that the fire origin was in the hotbox, the damage indicated a low- order gas vapor explosion, the only thing in the box was the product in the drums, certain drums burned differentially and very hot, some of the drums contained EDC and toluene, known flammable substances, and other potential causes were ruled out. Russo was unable to determine the ignition source because he had insufficient information, but the possibilities were: sparks, static electricity, or auto ignition of vapor. Sparks were ruled out when electrical malfunction was ruled out. He deferred to chemist Andrew Armstrong for the opinion on ignition source.[44]

Similar methodology was found reliable in *Russell v. Whirlpool Corp.*[45] A certified fire investigator interviewed the owner of the burned structure,

[43] 5 RR 137-138.
[44] 5 RR 140, 155-161.
[45] 702.3d 450 (8th Cir. 2012).

examined and documented the scene, identified a suspect area by examining burn patterns on walls and appliances, noted the complete erosion of metal in the suspect refrigerator, which he found at bottom of debris, applied his specialized knowledge, and excluded alternative causal theories in reaching his conclusion that the refrigerator caused the fire. 702 F.3d at 455-57. The court found that the expert's methods were rigorous and based on more than vague theorizing or ipse dixit logic, and that there was no analytical gap between the evidence and the expert's opinion. *Id.* at 457. The court reasoned that the defendant's arguments were better addressed to the jury regarding the weight to be afforded the plaintiff's expert's opinion, and noted that the Supreme Court has emphasized the usual tools to expose flaws in evidence remain available: "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." 702 F.3d at 457-58, citing *Daubert*, 509 U.S. at 596, 113 S.Ct. 2786. *See also Olympic Arms, Inc. v. Green*, 176 S.W.3d 567, 585 (Tex.App. – Houston [1st Dist.] 2004, no writ) (although defendant "exposed some weaknesses" in plaintiff's expert's opinions, *Robinson* provides that the jury is to assess the weight and credibility of an expert's proffered testimony, and

cross-examination is the traditional and appropriate means of attacking shaky but admissible evidence).

4. Expert forensic chemist Armstrong's opinion was that EDC contamination caused rapid chlorpyrifos decomposition and flammable vapors that auto-ignited.

Dr. Andy Armstrong is a well-known chemical fire expert. Armstrong Forensic Laboratory is an accredited fire science lab for criminal investigation work in chemistry, fire science, and identification of ignitable fuels from suspect fires. He has a Ph.D. in chemistry, is a certified forensic chemist in fire debris analysis, and is a fellow in the American Academy of Forensic Science. He has published over 20 scientific articles and teaches chemistry at UT Arlington. He sits on the ASTM Committee for Forensic Science, and was chairman of the subcommittee responsible for standardizing tests to identify ignitable liquids.[46] He is involved in over 1,000 fire cases a year, and has testified in numerous criminal and civil cases in Texas. Armstrong has extensive experience with spontaneous combustion incidents from self-heating chemical reactions.[47]

Armstrong's testing found ignitable vapor EDC in the drums. Based upon the scientifically-known characteristics and qualities of EDC and chlorpyrifos,

[46] ASTM is the American Society of Testing Materials.
[47] 5 RR 169-182; 6 RR 13-14.

Gharda's literature about decomposition and self-heating of chlorpyrifos, and temperatures in the hotbox, his opinion was that EDC contamination caused rapid decomposition of the chlorpyrifos, and creation of significant flammable vapors that auto-ignited.[48]

a. 3M badge evidence of EDC contamination.

Armstrong recommended sampling of the drum vapor space for ignitable liquids by 3M charcoal badge testing – a standard fire debris test under ASTM standards 1413 and 1618.[49] Gharda's expert, Wayne Britton, agreed that the 3M badge test was appropriate methodology and accurate.[50] Ignitable liquids are often consumed in a fire, but they leave fingerprints. The badges identify trace quantities of chemicals in the vapor space, but cannot measure quantity. That can be done only if enough product remains after a fire.[51]

A gas chromatography mass spectrometry (GC-MS) test was run on the 3M badges. The test identified significant levels of toluene and detectable levels of EDC. Initially toluene was the suspected contaminant, until it was learned during discovery that copious quantities of EDC, and no toluene, are used by Gharda in

[48] 5 RR 207-210.
[49] 5 RR 182-183.
[50] 9 RR 98-99.
[51] 5 RR 178, 183, 187; 6 RR 18-21, 99.

the manufacture of chlorpyrifos. Gharda's MSDS for this product, states that it is 99% pure, with 1% "inert" ingredients. Included but not disclosed in the "inert" ingredients is EDC, a flammable liquid.[52]

There is no mechanical or chemical process to generate EDC by the thermal degradation of chlorpyrifos. This means that EDC was in the drums at the time the chlorpyrifos was shipped, and not created during the fire. The product left Gharda's factory sealed and arrived at CSI's warehouse sealed. There is no evidence that the drums were tampered with in any way. It was reasonable, therefore, for the jury to conclude that the EDC was in the product when it was packaged at Gharda's plant.[53]

The 3M badge test results alone do not necessarily mean that a product is contaminated, because 1% EDC would be expected according to the manufacturing specifications. But that is not the point. The significance of the testing is that EDC distribution between drums was not uniform; it differed between drums of a supposedly uniform, homogenous product. EDC was found in 8 of the 32 barrels tested, inconsistent with Gharda's assertion that the chlorpyrifos was uniform product.

[52] 5 RR 187, 214; 6 RR 40, 45, 47.
[53] 5 RR 207.

Gharda's contention that the badges could not measure quantity (Gharda's Brief at 18) is a red herring. As a practical matter, quantity-testing could not be done because the product was damaged or destroyed in the fire. More important, badge-testing disproved Gharda's main defense that the product was uniform, homogeneous, and incapable of contamination during manufacture.

Armstrong testified that it is "remarkable and strange" that EDC was found in the drums because it is volatile, and usually consumed in a fire.[54] His opinion was that there is a reasonable scientific probability that EDC was the impurity that led to the fire because of its presence in some drums and not others, and the differing distribution level of EDC between the eight drums that tested positive.[55] While Gharda argued that the badge test was unreliable because the two most severely-burned drums tested negative for EDC, Armstrong explained that EDC is so volatile, and its boiling point so low, that it is usually consumed in a fire. He was surprised to find EDC in any drums post-fire, and would not expect any in the most severely-burned drums.[56]

[54] 6 RR 38, 45-46, 70.
[55] 5 RR 207-209.
[56] 6 RR 38, 45-46, 68-70.

b. Contamination decreases melting point, and increases decomposition and ignitable vapors.

The chemical characteristics and qualities of chlorpyrifos and EDC have long been known and documented in the scientific community. Armstrong testified that he relied on those established scientific characteristics of the chemicals for his opinion that impurities in the chlorpyrifos decrease its melting point, and increase the rate of decomposition and creation of ignitable vapors.[57]

The MSDS Gharda provides to customers says that decomposition starts at 266°F. However, a Gharda-sponsored study done for the EPA states that chlorpyrifos violently decomposes at 222°F. Gharda's own internal documents say decomposition and exothermic heat generation begin at 158°F, become rapid at 194°F, and violent at 248°F. Australian EPA and Dow Chemical studies say decomposition can occur spontaneously at low temperatures.[58]

Scientifically, these studies show that a mechanism exists to generate a significant amount of vapor in the hotbox due to thermal decomposition, and the reaction is faster the higher the temperature. The studies demonstrate that the chlorpyrifos would have begun rapid decomposition, and generated significant

[57] 6 RR 71.
[58] 5 RR 192, 195-201.

ignitable vapors, below the recommended hotbox temperature of 180°F. A recognized chemistry principle, Raoult's law, states that the presence of an impurity lowers the melting point of a chemical, meaning that it melts faster.[59] Gharda's quality control chemist, Shreeniwas Jakali, confirmed this fact, testifying that contamination would lower the melting point of the chlorpyrifos making it decompose faster.[60]

c. Spontaneous combustion of ignitable vapors is the probable ignition source.

Armstrong testified that the most probable ignition source was spontaneous combustion of the ignitable vapors. Spontaneous combustion is a self-heating chemical reaction. If the heat in a certain space cannot be dissipated, it leads to increased self-heating, and eventually spontaneous ignition. Classic cases of spontaneous combustion are a wet bale of hay or a stained rag. Left by themselves, one hay bale or one rag will not combust. However, combined in a hay stack or a bundle of rags, there is insulation, heat is retained and chemical or biological reactions occur. In the presence of oxygen, the haystack or rag pile will begin to char or smolder, and eventually combust.[61]

[59] 5 RR 202-203.
[60] 8 RR 156.
[61] 5 RR 178-182; 6 RR 62.

The evidence here makes spontaneous combustion probable. Thermal decomposition of chlorpyrifos due to the EDC impurity caused it to have a lower melting point, and to decompose at a lower temperature, generating heat and ignitable vapors. The more decomposition and gas, the hotter the system gets in an enclosed insulated space like the hotbox, and the reaction proceeds more rapidly, generating even more gas vapor. Auto-ignition of vapors is the most probable cause considering the high burning of two or three of the drums, which would have created a greater concentration of free radicals needed for combustion. Mechanical or electrical sparking was ruled out by the engineering investigation, and static discharge was a less likely possibility.[62]

d. Gharda's supposed "undisputed test results" were in fact hotly contested by CSI's experts

Gharda also complains that the court of appeals "disregarded undisputed results" of testing by its experts which "disprove CSI's theory."[63] While such countervailing evidence is generally not relevant in a legal-sufficiency review, even if it were relevant here, Gharda ignores that the methodology and relevance of its testing were indeed hotly contested by CSI and its experts, who criticized

[62] 5 RR 202-210, 215-217.

[63] Petitioner's Brief at 7, 11, 15.

Gharda's testing for failing to duplicate (or even approach) the real conditions in the hotbox,[64] and for defects in its sampling procedures.[65] Again, the jury was presented with conflicting evidence from qualified experts, and believed CSI's experts over Gharda's.

e. Gharda offered no alternative plausible cause.

Notably absent from Gharda's Brief is any statement of a plausible, provable alternative theory of causation. During trial, Gharda attempted to prove that the fire started outside the hotbox. But there was abundant evidence upon which the jury could reasonably conclude, as it did, that the fire started inside the box. Gharda offered no alternative cause for the fire if the jury believed the fire originated in the box. Armstrong's expert opinion is legally sufficient evidence of the probable cause of the fire because it provides competent evidence of a causal link between the product and the fire. *See Kindred v. Con/Chem, Inc.*, 650 S.W.2d 61, 63 (Tex. 1983) (workers injured in fire in tank after spraying paint containing a "very flammable mixture" at temperature near its flash point, expert testified paint could have been produced without volatile ingredients, even without

[64] 6 RR 63-65, 81-82, 97-98, 216-217.
[65] 6 RR 130-31, 136-140; 8 RR 92-94, 109-114.

definitive theory of ignition, evidence was legally sufficient to submit the issue to the jury).

A manufacturing defect exists when a finished product deviates, in terms of its construction or quality, from the specifications or planned output in a manner that renders it unreasonably dangerous. *Driskill v. Ford Motor Co.*, 269 S.W.3d 199, 204 (Tex. App. – Texarkana 2008, no pet.). Contamination is a form of manufacturing defect. *Shamrock Fuel & Oil Sales v. Tunks*, 416 S.W.2d 779, 782 (Tex. 1967). Armstrong concluded that the presence of sufficient EDC in the chlorpyrifos to cause a fire was outside the manufacturing specifications, and a product defect.[66] That opinion was legally sufficient to support the jury verdict.

f. Armstrong's opinion was legally sufficient evidence as to cause and product defect.

The foundation of Armstrong's cause and product defect opinion was reliable because it was based upon standard 3M badge forensic testing and fire science methodology, and correlated the chemistry test data to the physical evidence and eyewitness testimony. Armstrong's decomposition and ignitable vapor theory relied on well-established and published scientific data regarding the quality, nature and characteristics of the chemicals involved, including melting

[66] 5 RR 212.

points, decomposition characteristics of chlorpyrifos, and flammability and flashpoint characteristics of EDC.[67] Gharda's experts relied upon the same scientific information and studies.[68]

Armstrong followed the scientific method in considering and discarding other possible sources of fuel for the fire in the hotbox, such as toluene, and causal mechanisms other than vapor generation that were not consistent with the known facts. Direct evidence of cause is not available because no one was in the hotbox when the fire occurred, and the product in the box was consumed or damaged in the fire. Armstrong's opinion scientifically establishes the causative link between the fire in the hotbox and the only item in the box: the chlorpyrifos, which showed evidence of contamination and non-uniformity.[69]

Both direct and circumstantial evidence may be used to establish a material fact. In a similar case, *Kindred v. Con/Chem, Inc.*, 650 S.W.2d 61 (Tex. 1983), the Court held that the testimony of a chemist regarding the chemical properties and flashpoint of a paint primer suspected to be the cause of a flash fire, was legally sufficient to submit a design defect issue to the jury, even though there was no

[67] 5 RR 208; 6 RR 34, 48, 63, 70-72, 77, 91.
[68] 8 RR 155-158; 9 RR 52-53, 65, 87, 98.
[69] 5 RR 211-214, 212; 6 RR 30, 84-85, 110-111.

direct evidence of ignition source. Armstrong's opinion was equally reliable and legally sufficient to support the product-defect finding.

5. Expert chemical process engineer Cheremisinoff's opinion was that EDC contamination occurred at Gharda's plant.

CSI's expert on Gharda's manufacturing process and quality control was Dr. Nicholas Cheremisinoff. He has a Ph.D. in chemical engineering, with an emphasis on mass transfer systems in multiphase processes in chemical manufacturing operations. He has worked for several national chemical manufacturing plants and currently works in Exxon's chemical product development division. He has written hundreds of chemical engineering textbooks regarding product design and testing, processing, quality control and safe handling, and has testified as an expert for Congress, the Department of Energy and the Department of Defense. He has worked often using the ISO 9000 international standards organizational protocol and management procedure for quality control for product manufacturers.[70]

Cheremisinoff reviewed manufacturing and quality control information, witness testimony, the product specifications, physical evidence and forensic samples, and the expert testing. His opinion, based on a reasonable degree of

[70] 6 RR 112, 114-118.

scientific probability, was that the chlorpyrifos was contaminated because Gharda's manufacturing processes were flawed.[71]

a. Flaws in manufacturing process.

Gharda's specification for U.S. grade chlorpyrifos is 99% pure, with 1% "off spec" materials, including water, pyridine products, EDC and methanol, the latter three of which are flammable. The certificate of analysis of the product, and the MSDS provided to the consumer by Gharda for safe handling of the chlorpyrifos, failed to disclose that the "on spec" product contains 1% flammable chemicals.[72]

Gharda's process, furthermore, left plenty of room for human error. Chlorpyrifos is manufactured in batches produced by an operator. EDC is used in the production of chlorpyrifos, and is initially 50-60% of the product by weight. The EDC is reduced to 5% by distillation, shown by a pressure gauge drop, and the process is repeated until EDC measures less than 1% of the product.

Gharda relies on the operator to determine when vacuum distillation has removed enough EDC from the product, and operators can make errors. In such a system, any number of variables provide the opportunity for contamination, including loss of pressure on the vacuum system, washout of EDC left from a

[71] 6 RR 139-140, 172.
[72] 6 RR 124-129, 141, 178.

previous production, failure of gauges, operator distraction, or contamination by the local grade product, which has 6% impurities and is manufactured at the same plant.[73]

b. Flaws in quality control process.

Cheremisinoff concluded that Gharda's quality control sampling approach is inherently flawed. First, there are no records kept of the sampling test results during the manufacturing process. Second, sampling of the final product is done in very small aliquots of 20-25 ml per drum, and only 5 to 6 drums in a batch of 30 are tested, which is insufficient for a batch that size. Cheremisinoff calculated that .003-.007% (three-to-seven thousandths of one-percent) of the product is actually tested.[74] Third, the aliquots are mixed into one homogenous, composite sample, diluting the overall results. The composite is made by heating and mixing the aliquots, which skews the test results.[75]

c. Plant contamination consistent with other evidence.

Cheremisinoff's opinion that flaws in the manufacturing and quality control processes made it scientifically probable that contamination occurred at the plant was consistent with the other evidence. Gharda's plant makes two grades of

[73] 6 RR 130, 135, 220, 229; 8 RR 92.
[74] 6 RR 131, 139, 176.
[75] 6 RR 134-138; 8 RR 109, 176.

chlorpyrifos: a "pure" 99% U.S. grade and a 98% local grade. The quality control director testified that the local grade has up to 6% impurities, and the impurities are not routinely checked. Gharda recommends melting of the 98% local grade in a hot water bath of 158°F. If the local grade, made at the same plant, was shipped by mistake, there would have been 6% "inert" flammable ingredients in the product.[76]

Numerous Gharda witnesses testified that it was "impossible" for the plant to manufacture "off spec" chlorpyrifos, the batches are uniform, and there is no way to contaminate part of a batch. Nevertheless, Gharda's quality control chemist, Mr. Jakali, admitted that contamination of part of a batch can occur. He testified that "it is not common," but it does happen that quality control results in a drum may be "off." However, even if any one drum is "off," other drums from the production may still be used. No batch is ever rejected, just modified.[77] If the jury believed that testimony, they could reasonably believe contamination occurred in part of the CSI production batch.

[76] 6 RR 231; 8 RR 167; 9 RR 238; 10 RR 21.
[77] 8 RR 114, 178.

d. Cheremisinoff's opinion regarding plant contamination was reliable.

The foundation of Cheremisinoff's opinion was reliable. It was based on Gharda's own documents and testimony regarding its manufacturing and quality control process, ISO standards regarding quality control, scientifically-established qualities of the chemicals, and his own knowledge and expertise in chemical processing systems.[78] Gharda says Cheremisinoff testified contamination was "possible" when explaining processing and manufacturing flaws at Gharda's plant.[79] His ultimate opinion, however, was based upon "reasonable scientific probability."[80] His opinion is consistent with the physical evidence, the fact that drums of the allegedly uniform product burned with different intensity in the hotbox, and the fact that product is shipped sealed from the plant to the customer. His opinion was reliable and legally sufficient to support the verdict.

The court of appeals found Cheremisinoff's opinion reliable because it was based on Gharda's own documents and testimony, applicable ISO standards, his knowledge and experience in chemical-processing systems, and the physical evidence and test results.[81] Gharda has failed to present any evidence that

[78] 6 RR 140-141, 233-237.
[79] Gharda's Brief at 3, 24-26.
[80] 6 RR 120-121, 131-133, 139-142, 147, 152.
[81] 6 RR 140-141, 233-237.

Cheremisinoff's testimony is false or that his testing principles were not reliable. Again, the basis of Gharda's issues lie in their dislike or disagreement with the Cheremisinoff's conclusions, not his methodology.

B. Gharda's criticisms of CSI's experts' opinions are based on mischaracterization of existing law and if accepted would result in unreachable standards for admissibility of expert opinions on fire cause and origin.

The key flaw in Gharda's Brief is its repeated demand for "high standards" and "high scrutiny" of expert testimony on causation in fire cases[82] – language that does not appear in any of this Court's opinions. In other words, Gharda is asking the Court to create a new and different set of rules for experts in fire cases. There is no need to change the law in this manner. Indeed, Gharda is advocating a standard under which no fire case could ever be proven.

Fire is highly destructive in nature, consuming evidence and leaving fire investigators with the challenging task of determining its cause and origin based on the remaining debris.[83] It has long been recognized that a fire's cause must often be proven through a combination of common sense, circumstantial evidence and expert testimony.[84] Determining a fire's cause and origin often

[82] Gharda's Brief at 11.

[83] Scientific and Legal Developments in Fire and Arson Investigation Expertise, R. Dioso-Villa, 14:2 Minn. J. L. Sci. & Tech. 817, 818 (2013).

[84] *Minerals & Chemicals Philipp Corp. v. S.S. National Trader*, 445 F.2d 831, 832 (2nd Cir. 1971).

carries serious consequences, from civil liability to criminal conviction. It makes sense, accordingly, that standards exist for investigating and determining fire cause and origin. These standards were followed to the letter by CSI's experts.

1. CSI's experts performed and relied on testing supporting key components of their theories – Gharda's demand for full-scale re-creation and testing of every aspect of fire cause and origin would change the law and render fire cause and origin determination practically impossible.

Complaints about insufficient testing by CSI's experts are strung throughout Gharda's brief. But the heart of Gharda's complaint is that "testimony about a theory of causation requires that all parts of an expert's theory be supported by scientifically reliable testing."[85] For this proposition, Gharda cites this Court's opinions in the *Camacho* and *Ramirez* cases, neither of which support it.

Camacho[86] involved a trailer fire that killed a teenage boy. The plaintiff's expert opined that the fire was caused by the defective design of a clothes dryer's lint tube, which he posited allowed lint to collect in and clog the tube, causing lint to back up into the blower housing and be blown across the heater box, ignite, enter the drum, and ignite the clothes there.[87]

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[85] Petitioner's Brief at 11.

[86] *Whirlpool Corp. v. Camacho*, 298 S.W.3d 631 (Tex. 2009).

[87] 298 S.W.3d at 635-36.

All of the key dryer parts involved in the expert's theory had been damaged or destroyed in the fire, so his theory was based on general engineering knowledge, examination of an "exemplar dryer" that had a lint tube heavily clogged with lint, and a government test of dryer lint ignition. But the expert admitted there was no evidence that the exemplar dryer with the clogged tube was used under the same conditions as was the subject dryer, and further admitted the following:

- He had not seen, read of, or performed a test showing that a corrugated lint transport tube in a properly vented dryer such as the plaintiff's would become clogged with lint.

- He did not test his theory that lint would be blown into the heater box if the lint transport tube became clogged.

- He did no tests to determine the maximum size or weight of lint particles that could be drawn into the heater box.

- He did no tests or calculations to determine whether lint particles that were small enough to pass through the inlet grill's openings into the dryer drum were capable of remaining lit long enough or producing sufficient heat to ignite clothes in the dryer drum; or how ignited lint particles small enough to pass through the inlet grill could survive and smolder inside a tumbling clothes load.

- The only test the expert relied on was a government study about ignition of much larger pieces of dryer lint than would have been present in the subject dryer (because of the presence of an inlet screen), ignited on a heating element and carried directly onto open,

> fixed pieces of lint and cloth that were secured in place, rather than into a tumbling drum.[88]

Not surprisingly, the expert's testimony was deemed unreliable.[89] But the Court was quick to explain that testing every component part of an opinion is not required:

> "Testing is ***not always required*** to support an expert's opinion, but lack of relevant testing ***to the extent it was possible***, either by the expert or others, is ***one factor*** that points toward a determination that an expert opinion is unreliable. [citations omitted]. If testing of critical aspects of an expert's testimony has not taken place ... then an ***explanation*** of why it has not is an important ***consideration*** in evaluating the expert opinions and determining whether they are substantively more than merely the expert's conclusory, subjective opinion.[90]

In *Garcia v. BRK Brands, Inc.*,[91] a federal case cited by Gharda for the proposition that testing is the "most significant *Daubert* factor," the court also noted that (1) a single test might constitute sufficient foundation where multiple tests are unavailable or impracticable because of prohibitive expense or other reasons; and (2) experts need not conduct "hands-on" testing in every case.[92] In that case, the court rejected an expert who "inexplicably failed to perform even

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[88] 298 S.W.3d at 640-41.
[89] 298 S.W.3d at 43.
[90] 298 S.W.3d at 642-43 (emphasis added).
[91] 266 F.Supp.2d 566 (S.D.Tex. 2003)
[92] 266 F.Supp.2d at 574-76.

the most basic scientific testing" of his theory that a properly functioning smoke alarm would have woken the decedent before he died of carbon monoxide poisoning.[93]

CSI's experts relied on the 3M charcoal badge testing, using gas chromatography mass spectrometry (GC-MS) to detect the presence of flammable chemical vapors, which were found in some but not all of the drums, indicating a non-uniform product. The test, which Gharda admitted was valid and appropriate, showed the presence of flammable EDC in some of the drums, which was not listed in Gharda's MSDS description of its product. Gharda claims that the contaminants found on the charcoal badges could have resulted from decomposition of the chlorpyrifos, but the suspect contaminant, EDC, is not a product of decomposition of chlorpyrifos.[94]

CSI's experts also relied on testing performed by others, including Gharda's own internal test results, showing that its product began to decompose and self-heat at temperatures substantially lower than disclosed to its customers, and at temperatures below those present in the hotbox. This testing and reliance on test results far exceeds that referenced in *Camacho*. While Gharda complains about

[93] 266 F.Supp.2d at 573.
[94] 5 RR 207.

other testing that CSI might have done, CSI's experts were vigorously cross-examined on those subjects and gave explanations that the jury accepted. The jury's verdict deserves respect. *See*, *e.g.*, *E-Z Mart Stores, Inc. v. Ronald Holland's A-Plus Transmission & Automotive, Inc.*, 358 S.W.3d 665, 671 (Tex.App. -- San Antonio 2011, writ denied) (plaintiff's expert's opinions regarding underground migration of chemicals were countered by defendant's expert's criticism of interpretation of test results, but it was within the jury's province to resolve any inconsistencies, and jury could credit plaintiff's expert's testimony).

Similarly, in *Volkswagen of America, Inc. v. Ramirez*,[95] which involved a fatal vehicle collision, the plaintiff's expert did ***no testing*** of his key theory that the plaintiff's vehicle's axle failed before (and caused) the accident and did not result from the accident. Specifically, he did no testing to confirm that the axle could have failed, allowing the wheel to become disconnected and cause the accident, but remain with the car, in the wheel well, as the car veered of the highway, crossed a grass and concrete median, collided with another car head-on, and spun around before coming to rest. This Court reasoned that it was "far from clear how the detached wheel could follow the vehicle in the wheel well as it crossed the median," expressed concern that the plaintiff's expert "performed no tests and

[95] *Volkswagen of America, Inc. v. Ramirez*, 159 S.W.3d 897 (Tex. 2004).

cited no publications to support his opinion," and concluded that the expert failed to close the analytical gap by explaining how the wheel could behave as he described, without any objective scientific analysis.[96]

In contrast, CSI's experts described how the fire occurred using objective scientific and experience-based analysis of the physical evidence, including test results and the documented characteristics of the products involved.

Gharda also criticizes CSI's experts for not doing additional testing, namely: (1) not testing for quantities of contaminants in the burned remnants of its product; (2) not testing "virgin remains" from two drums of the same shipment "that had not been exposed to the fire or the atmosphere"; (3) not testing the samples or "retains" of its product for contaminants; and (4) not testing for ignitability of contaminated product. This testing, however, would have been irrelevant or superfluous.

a. The quantities of contaminants in the burned remnants was irrelevant.

CSI's experts explained that because of the heat and fire damage to the drums of chlorpyrifos, the quantity of EDC remaining after the fire would not be useful information.[97] What was important was that EDC was present in some

[96] 159 S.W.3d at 906.

[97] 6 RR 21.

barrels but not others. The fact that any EDC remained after the fire was surprising, given its volatility, and the fact that some barrels showed its presence and others did not, showed non-uniformity of a supposedly uniform product.[98]

b. There were no"virgin remains" from two drums of the same shipment.

Gharda claims that CSI recovered two "virgin" drums of chlorpyrifos that had not been exposed to fire or the atmosphere but "chose not to test them." This is just plain wrong. The record reflects that CSI recovered two "unburned" barrels of chlorpyrifos from "where the fire was, the burned warehouse," and that one was "half full." It does not reflect that the barrels were "virgin" or unexposed to the heat of the fire and, if anything, suggests that they were not.[99] The only record testimony about the suspect shipment came from CSI's vice-president of operations, who testified that half of the 64 suspect drums were in the hotbox, and the other half were in the tech storage area that was completely destroyed by fire. He was unaware of any suspect drums that survived the fire.[100]

[98] 5 RR 207-209; 6 RR 38, 45-46, 70.
[99] 6 RR 96-100.
[100] 3 RR 289.

c. CSI explained why testing of Gharda's retains was not necessary or reliable.

CSI's experts explained that they did not test Gharda's retained samples because (1) Gharda tested them; and (2) they did not believe the samples would be relevant, because of problems with Gharda's sampling procedures. In other words, even if the samples did not show excessive EDC, this was irrelevant because Gharda did not take enough samples, and it mixed together the few samples it took, making the results immaterial.[101] The retains represent only micro liters of the 20,000 pound batch; they were tested after expiration of the quality-control date for sample integrity; and the paperwork verifying the retains were from the suspect batch was lost at Gharda's plant.[102] Thus, even if this testing had any potential relevance, there were adequate explanations of why it did not take place. *See Camacho*, 298 S.W.3d. at 642-43.

d. Testing for ignitability of contaminated product was not practical or necessary.

CSI's experts explained that it would not be practical to recreate the probable ignition scenario. In order to recreate the event, a duplicate hotbox would have to be constructed to replicate heat transfer and other conditions

[101] 6 RR 130-31, 136-140; 8 RR 92-94, 109-114.
[102] 6 RR 80, 135-139, 143; 20 RR Def. Exhibits 19-40, pg. 1.

inside the hotbox, and it would then have to be filled with multiple drums of chlorpyrifos, of various levels and types of contamination, with multiple tests being necessary to test various rates of heating and other conditions potentially present at the time of the fire. Such testing would have been very costly and environmentally dangerous.[103] *Daubert* and *Robinson* were never intended, and have never been applied, to impose this insurmountable burden on litigants.

3. Gharda's proposed prohibition against experts relying on each other's opinions would change the law and reduce, rather than enhance reliability of expert testimony

The dissent below noted that the "central theme" of Gharda's objections to CSI's experts at trial was that each of CSI's experts "depended on some critical element that had to be supplied by another expert."[104] Gharda continues to complain of the "interdependent web" of CSI's experts' opinions.[105] But it is well accepted that experts may rely on information from sources other than their personal knowledge, including other experts.[106] One court recently recognized

[103] 6 RR 63-65, 81-82, 97-98, 216-217.

[104] 394 S.W.3d at 178.

[105] Gharda's Brief at 1.

[106] *See, e.g.*, Tex. R. Evid. 703 (experts may base opinions on facts or data perceived by, reviewed by, or made known to them, and may consider evidence that would be otherwise inadmissible if it is of a type reasonably relied upon by experts in the particular field in forming opinions or inferences upon the subject); *Kelly v. Rendon*, 255 S.W.3d 665, 676 (Tex.App. – Houston [14th Dist.] 2008, no writ) (physician may rely on a nurse's report in the formation of the physician's own opinion); *Packard v. Guerra*, 252 S.W.3d 511, 532-33 (Tex.App. – Houston [14th Dist.] 2008, no writ) (physician experts could rely on attorney's expert opinion in the formation of their own

that “[e]xperts in fire cases often rely upon the observations of other experts in reaching their conclusions,” and that “[a]n expert does not have to conduct his own tests and may rely upon data that he did not personally collect."[107]

As correctly pointed out by the majority below, each expert is to be evaluated and his reliability is to be determined separately, and one expert can rely on the opinions of another expert who has been found reliable. Any other rule, applied in any case with complex issues, would require “super-experts” who would need the expertise to opine in multiple fields of study. In this case, experts were required in the areas of fire cause and origin, chemistry, and chemical engineering and production. Disallowing reliance between experts would reduce the reliability of expert testimony by discouraging the use of specialized experts and encouraging if not requiring the use of questionable “experts-on-everything.” This Court should reject this dubious approach.

opinions regarding the standard of care and causation).

[107] *Argonaut Ins. Co. v. Samsung Heavy Ind. Co. Ltd.*, 929 F.Supp.2d 159, 168 (N.D.N.Y. 2013) .

4. Gharda's rejection of the value of consistency and elimination of alternative causes in determining fire cause and origin contradicts law and common sense.

a. Consistency between evidence and cause and effect theories is an important indicia of reliability, not a sign of unreliability.

Gharda complains that the court of appeals erred in accepting the opinion of fire investigator Russo because the evidence he cited was "merely consistent" with his conclusions as to the origin of the fire. But Russo testified that his opinion that the fire started in the hotbox was "consistent with" the following facts:

- TV News footage showing fire in the area of the hotbox;
- Firefighter reports of fire in the hotbox area when they initially entered the building to fight the fire;
- Heating of the metal roof, paint discoloration, and the displacement of a ridge vent on the roof over the location of the hotbox;
- Spring door latches and bent hinges on the hotbox;
- The rumble or boom reported by the only witness on the scene;
- Burn patterns within the hotbox, outside the hotbox, and all over the building.[108]

Consistency between evidence and theory is hardly pernicious, particularly where, as here, the other consistent facts are probative of the validity of the

[108] See 394 S.W.3d at 147-48.

expert's opinion. This Court's jurisprudence indicates that to be considered reliable, theories must not be "merely consistent" with the evidence – that is, the evidence cannot be simply a coincidence or consistent with both the offering party's theory and other theories. For example, in *Mack Trucks, Inc. v. Tamez*, 206 S.W.3d 572 (Tex. 2006) this Court rejected an expert's conclusions because the facts he cited were "merely consistent" with diesel fuel having been released during the rollover of a truck. The expert's cited facts did not prove that the fuel was released because of one of the asserted defects in the truck's fuel system, and he did not rule out the crude oil cargo as being the source of the fire. 206 S.W.3d at 580-81. Similarly, in *Camacho*, the facts cited by the expert were merely consistent with a fire in and around the dryer, not necessarily with a fire originating in the dryer. 298 S.W.3d at 643.

In contrast, meaningful consistency between physical evidence and an expert's theory has lent crucial support to the Court's approval of expert testimony in several cases. In *Hughes*, the Court pointed to consistency between gouge marks found in the road and the expert's theory of how the car/truck collision occurred. 306 S.W.3d at 236-37. In *Ledesma*, the Court approved admission of expert testimony where the expert's observation of rust and scratch

marks on a car part showed loose assembly, which together with other physical evidence and witness statements, was consistent with his theory that vibration of the parts caused a fatigue fracture dislocation of the drive shaft, resulting in the accident. 242 S.W.3d at 38. Russo's testimony is similar to the experts in *Hughes* and *Ledesma* in that he relied on multiple observations and pieces of physical evidence, all of which were consistent with his theory of fire origination. It is not at all like the testimony in *Tamez* and *Camacho* where experts cited isolated facts that proved very little.

b. Elimination of alternative causes is another important indicia of reliability, not a sign of unreliability.

Gharda and the dissent below criticize CSI's experts for employing elimination of alternative causes in their determination of the fire's cause. Yet this Court has repeatedly stressed the ***necessity*** of eliminating alternative causes in reaching reliable expert opinions. *Robinson*, 923 S.W.2d at 559 (expert should carefully consider alternative causes); *Hughes*, 306 S.W.3d at 237 (expert's failure to rule out alternative causes of an incident may render his opinion unreliable)(citing *Merrell Dow Pharm., Inc. v. Havner*, 953 S.W.2d 706, 720 (Tex.1997)); *Merrell*, 313 S.W.3d at 840 (expert's failure to explain or adequately disprove alternative theories of causation makes his or her own theory

speculative and conclusory) (citing *General Motors Corp v. Iracheta*, 161 S.W.3d 462, 470 (Tex. 2005)).

Gharda cites *Mendez* for the proposition that "causation cannot be based on the process of elimination."[109] But *Mendez* concerned the failure of a tire with 30,000 miles on it and a nail hole in it, and the Court logically concluded that under those circumstances, "the universe of possible causes for the tire failure is simply too large and too uncertain to allow an expert to prove a manufacturing defect merely by the process of elimination." 204 S.W.3d at 807-808. The Court explained that if a product defect could be inferred via elimination of alternate causes, such a theory "would generally apply only to new or almost new products." 204 S.W.3d at 808.

In this case, in contrast, we are dealing with a new product that was the only substance in the isolated place of origination. Eliminating alternative causes such as electrical problems or other areas of origination reliably supports the finding of a product defect. Texas courts have accepted elimination of alternative causes as legally sufficient evidence of fire cause and origin. *Doyle Wilson Homebuilder, Inc. v. Pickens*, 996 S.W.2d 387, 394 (Tex. App. – Austin 1999, writ dism'd).

[109] Gharda's Brief at 10, 13.

C. Circumstantial Evidence of Causation is Sufficient Even Without Expert Opinion on Causal Mechanism.

Case law suggests that expert testimony is not necessary to prove causation in a product liability case. Circumstantial evidence of causation may be shown by the malfunction of a new or sealed product, under conditions that eliminate or make impossible other causes, and an injury that would not normally have occurred absent a product defect. *See Kindred* (chemist's testimony as to paint primer's properties, flammability, flash point, and temperature in tank where fire occurred legally sufficient circumstantial evidence of design defect and causation where it was only product in tank, and ignition source was unknown); *Shaun T. Mian Corp. v. Hewlett-Packard Co.*, 237 S.W.3d 851 (Tex. App. – Dallas 2007, pet. denied) (expert testimony that fire origin was in area of printer that arrived new and in sealed box from the manufacturer, that it was the only item plugged in, it burned longer and hotter than other items, and that new printers do not normally catch fire, was legally sufficient circumstantial evidence of product defect and causation).

Here, factually and legally sufficient circumstantial evidence exists that the fire and explosion originated in the hotbox, and the only item in the box was a product known to decompose into ignitable vapors. The product was under the

custody and control of the manufacturer, remaining sealed until just before it was put into the hotbox. The product was tested post-fire and found with "off spec" distribution of a flammable solvent used in the product's manufacture. Even without expert testimony, the circumstantial evidence is sufficient to sustain the jury's findings.

4. Conclusion

This Court should refuse Gharda's Petition for Review, because the Court of Appeals' judgment is correct and the legal principles announced in its opinion are likewise correct. In the alternative, the Petition should be denied for lack of error requiring reversal or of such importance to the jurisprudence of the State as to require correction. In the alternative, should the Court decide to grant review, it should affirm the Court of Appeals' judgment in its entirety.

Date: December 12, 2013

Respectfully submitted,

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Certificate of Compliance

I certify that this brief contains 11,454 words in Calibri 14-point font, in compliance with TRAP 9.4(i)(3) for computer-generated briefs, excluding the caption, identity of parties, table of contents, index of authorities, statement of the case, statement of jurisdiction, issues presented for review, the signature, certificate of service and certificate of compliance. In making this certification I have relied upon the Wordperfect Office X6 computer software program used to prepare the brief.

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In the Supreme Court of Texas

Gharda USA, Inc. and Gharda Chemicals, Ltd.,
Petitioners

v.

Control Solutions, Inc., United Phosphorus, Inc. and Mark Boyd,
Respondents

On Appeal from the First District Court of Appeals,
No. 01-10-00719-CV

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SUMMARY OF ARGUMENT IN REPLY

The Court should grant this petition (1) to address a court of appeals opinion that creates a roadmap in fire causation cases for evading this Court's *Robinson* jurisprudence, and (2) to prevent the imposition of an $8 million judgment without any reliable evidence of causation.

Legally, CSI cannot deny that the court of appeals opinion directly or impliedly contradicts this Court's causation jurisprudence in five ways that lower the bar for proving causation. Specifically, it: (1) accepts expert opinions based on possibilities rather than probabilities; (2) accepts opinions based on evidence that is merely consistent with a causation theory rather than directly probative of it; (3) accepts a causation theory based on the process of elimination; (4) accepts a causation theory from experts who failed to test each step of that theory; and (5) fails to credit undisputed evidence of testing by expert witnesses.

On the factual side, CSI's most glaring failure is its inability to prove levels of contamination of Gharda's product with sufficient levels of EDC to cause spontaneous combustion, ignition, and explosion. Specifically, CSI's own expert testified that the EDC levels in Gharda's product would have to be at least 1.2% to cause the fire. Yet the most generous view of the evidence reveals a level of no more than 0.034% in some of the batches that were shipped to CSI. There are other problems with the causation evidence, but that deficiency alone warrants reversal.

ARGUMENT IN REPLY

I. CSI cannot explain or justify the appellate court's systematic undermining of this Court's expert causation jurisprudence.

Gharda began its Brief on the Merits with the serious allegation that the published court of appeals opinion undermines this Court's expert causation jurisprudence in five different ways.

CSI's brief relegates this argument to the back of its brief, choosing to address the evidentiary arguments before confronting the effect this case could have on the jurisprudence of the state.

When it finally reaches the jurisprudential arguments, CSI fails to directly address two of the five arguments, and rearranges the order of the other three. For the arguments it addresses, it emphasizes meaningless factual distinctions from this Court's cases, and relies on cases from other jurisdictions and pre-*Daubert/Robinson* cases from this Court. It never convincingly denies the fact that the court of appeals opinion repeatedly ignores, distorts, or contradicts the consistent holdings of this Court regarding expert causation.

A. CSI cannot explain or justify the court of appeals's acceptance of a causation theory based on "possibility" rather than "probability."

Gharda demonstrated in its Brief on the Merits that reliable causation evidence must be based on probability rather than mere possibility. *See* BOM at 11-12.

CSI does not respond to this argument directly in the legal section of its brief; it certainly does not argue that evidence of mere possibility is sufficient.

Instead CSI can only claim that the opinion of its expert, Dr. Cheremisinoff, *was* based on "reasonable scientific probability." CSI's Brief on the Merits ("Response") at 37. In the factual section of this brief we will analyze each record reference cited by CSI and demonstrate that Cheremisinoff never testifies about the quantity of EDC contamination based on reasonable scientific probability, and, in fact, admits that he can only testify about that subject as a possibility. *See* section II.A.5, *infra*.

As will be demonstrated in that section, at best there were a few occasions when Cheremisinoff, or more frequently, CSI's lawyer, utter the words "reasonable scientific probability." But the Court should review Cheremisinoff's testimony as a whole to determine whether there is any reliable scientific basis for a probability-based opinion. When it does, it will find a consistent inability to directly prove contamination, for which Cheremisinoff can only speculate that human error in the production process could have caused contamination. When asked directly on cross-examination, he admits that he has no evidence that contamination actually occurred, only that it is possible. RR6:220-21. This Court should not bless that type of speculative causation analysis by an expert.

B. CSI cannot explain or justify the court of appeals's acceptance of a causation theory based on damages being merely "consistent with" a causation theory.

Gharda's Brief on the Merits cited authority from this Court holding that facts that are merely consistent with an expert's causation theory are "not probative evidence" and "do not make it more likely than not" that the theory is valid. *See* BOM at 12-13.

In response, CSI extols the virtue of consistency, which Gharda has not criticized as a minimal threshold. But CSI agrees that "to be considered reliable, theories must not be 'merely consistent' with the evidence." Response at 50 (citing *Mack Trucks, Inc. v. Tamez*, 206 S.W.3d 572 (Tex. 2006)). CSI's argument is that the "consistent with" evidence in this case is fundamentally different from the "consistent with" evidence in *Tamez*. But CSI's characterization of both cases is inaccurate.

First, CSI argues that in *Tamez* the problem was that the expert relied on facts that were consistent with diesel fuel being released during the truck rollover, but did not prove that the fuel was released because of defects in the truck's fuel system. As the *Tamez* opinion states,

> [T]he factors and facts are merely consistent with diesel fuel having been released during the rollover and Tamez having been burned by part of the fire fed by the tractor's diesel fuel. They are not probative evidence that diesel fuel was released because of one of the asserted defects in the fuel system or that it was ignited by the battery system. He did not testify to having analyzed, tested, or investigated the

> characteristics of batteries like the battery in the wrecked tractor to support his opinion that the battery system was involved in causing the fire.

Id. at 580-81. Similarly, in this case, the "consistent facts" that CSI's expert relied on "are not probative evidence" that the fire occurred "because of one of the asserted defects" in Gharda's product, and the expert "did not testify to having analyzed, tested, or investigated the characteristics of [Gharda's product] to support his opinion that [Gharda's product] was involved in causing the fire." For the same reason that the *Tamez* court rejected expert testimony based on merely consistent facts, so should this Court.

Second, CSI attempts to bolster the court of appeals' opinion by providing a list of facts in bullet points that were consistent with its expert's causation theory. Response at 49. Rather than provide citations to the record for these "consistent" facts, CSI merely cites to pages 147-48 of the court of appeals opinion. The problem is that most of the facts listed in CSI's brief cannot be found on pages 147-48 of the court of appeals opinion. Future litigants and lawyers will not have the benefit of CSI's brief, but merely the opinion containing conclusory remarks that Russo reviewed evidence that was "consistent with what I see quite frequently in my type of work," and that "the damage to the hotbox was consistent with his belief that a low-order explosion occurred." *Control Solutions, Inc. v. Gharda USA, Inc*, 394 S.W.3d 127, 147 (Tex. App.—Houston [1st. Dist.] 2012, pet. filed).

Accepting CSI's expert's opinion based on this description, if left undisturbed, appears to directly conflict with this Court's opinion in *Tamez*, and may undermine its effect.

C. CSI cannot explain or justify the court of appeals's acceptance of a causation theory based on nothing more than the process of elimination.

In its Brief on the Merits, Gharda demonstrated that this Court and respected commentators have rejected reliance on the "process of elimination" as means of proving causation. *See* BOM at 13.

In response, CSI conflates the process of elimination with the necessity to exclude other causes. *See* Response at 51. The exclusion of other causes is a minimum threshold, but that alone does not constitute direct evidence of causation.

CSI also attempts to mine the *Cooper Tire v. Mendez* opinion for helpful language, Response at 52, but comes up far short. The primary holding of that opinion is stated in no uncertain terms: "The universe of possible causes for the tire failure is simply too large and too uncertain to allow an expert to prove a manufacturing defect merely by the process of elimination." *Cooper Tire & Rubber Co. v. Mendez*, 204 S.W.3d 797, 807-08 (Tex. 2006).

Nevertheless, CSI looks to the secondary analysis in the *Cooper Tire* opinion, Response at 52, and finds a discussion of a theory based on Section 3 of the Restatement (Third) of Torts, which arguably recognizes a limited situation in

which proof by elimination of other causes may be inferable. But *Cooper Tire* makes it clear that section 3 of the Restatement has not been adopted in Texas, and expressly declines to do so. *See id.* at 808. Even if it did accurately reflect Texas law, section 3 applies only if "the incident that harmed the plaintiff: (a) was of the kind that ordinarily occurs as a result of a product defect; and (b) was not, in the particular case, solely the result of causes other than the product defect existing at the time of sale or distribution." *Id.* CSI neither pleaded nor obtained jury findings on those predicate facts.

D. CSI cannot explain or justify the court of appeals's acceptance of a causation theory in which not all aspects of the experts' causation theory was tested.

Gharda cited opinions from this Court demonstrating that "each material part of an expert's theory must be reliable," and that testing should support "all the various and critical parts of [the expert's] opinion." *Whirlpool Corp. v. Camacho*, 298 S.W.3d 631, 637, 642 (Tex. 2009); *see* BOM at 14.

CSI accuses of Gharda of attempting to change the law, argues for a relaxed standard of testing requirements, and asserts that *Whirlpool* is factually distinguishable. On all counts, CSI is wrong.

In *Whirlpool*, the plaintiffs' fire causation expert, much like CSI's experts in this case, was a well-qualified expert who relied on his experience, his review of relevant literature, and examination of the physical evidence from the fire scene,

including the dryer that burned, and a comparable exemplar dryer. *See Whirlpool Corp. v. Camacho*, 251 S.W.3d 88, 99 (Tex. App.—Corpus Christi 2008), *rev'd* 298 S.W.3d 631, 637, 642 (Tex. 2009). The expert ruled out other causes, including electrical problems, and noted several physical facts from the fire scene that were consistent with his theory. *Id.* The expert also relied on lint ignition tests performed by another one of the plaintiff's experts, and on tests related to dryer fires performed by the Consumer Product Safety Commission. *Whirlpool*, 298 S.W.2d at 640-41. Nevertheless, this Court found that the expert's analysis to be legally insufficient, in large part because "the only test on which he founded his theory about how the fire was started . . . did not support all the various and critical parts of his opinion." *Id.* at 642 (citing *Volkswagen of Am., Inc. v. Ramirez* , 159 S.W.3d 897, 906 ("pointing out that while an expert conducted tests related to one aspect of his theory, he never explained how those tests supported another aspect of his opinion")).

In *Volkswagen*, the plaintiffs' expert relied on considerably more testing than in this case or in *Whirlpool*. *See Volkswagen*, 159 S.W.3d at 906, n. 3 (describing the expert's review of lateral force, vertical force, and tire debead tests that he conducted, as well as crash tests, rollover tests, curb strike tests, and drag tests conducted by Volkswagen.) He also testified that he relied on his own extensive experience as an accident reconstruction expert and the basic laws of

physics. *Id.* at 904. But this Court found that the expert's opinions were not supported by reliable evidence because of the lack of testing to support critical parts of his causation theory, and the lack of peer-reviewed scientific literature to support his opinions. *Id.* at 905-06, 911-12. That same conclusion should be reached in this case where none of the three necessary steps in CSI's causation theory were supported by testing.

E. CSI cannot explain or justify the court of appeals's failure to consider to undisputed evidence of testing performed by Gharda's experts.

Gharda's Brief on the Merits established that the law requires that undisputed evidence of relevant testing by the defendant's experts must be considered in a legal sufficiency review of causation, but the court of appeals failed to consider that evidence.

CSI's response fails to even address this argument.

F. CSI's new, unresponsive arguments regarding causation are unavailing.

CSI's legal argument on causation injects two new arguments that are not directly responsive to Gharda's causation arguments. Nevertheless, they will be addressed briefly.

First, CSI incorrectly asserts that Gharda has argued that experts cannot rely on other expert's opinions. Response at 47-48. But that is an unfair and inaccurate characterization of Gharda's argument. Gharda does not argue that experts should

not rely on each other's opinions, as CSI suggests. Response at 47. Rather, Gharda's complaint was about CSI's circular theory, in which each expert relies on **unreliable, unproven** assumptions of other experts. The only citation or quotation from Gharda's Brief on the Merits in this regard is a statement from page 1 of the brief, mentioning an "'interdependent web of CSI's experts' opinions." Response at 47. But the full quote from the Brief on the Merits refers to "an interdependent web of **unreliable** expert opinions." BOM at 1 (emphasis added).

The problem is that CSI's overall causation theory is a circular chain with each step relying on hypothetical assumptions — or as the dissent said, "one conditional opinion stacked upon another stacked upon another . . . ." 394 S.W.3d at 184 (Massengale, J., dissenting). A single unreliable step causes the entire theory to collapse. CSI never rebuts this weakness in its theory.

Second, as a last-ditch effort, CSI attempts to suggest, for the first time in the history of this case, that causation evidence in a product liability case does not require expert testimony, but can be established by circumstantial evidence. Response at 53. CSI cites a single case from this Court, *Kindred v. Con/Chem, Inc.*, 650 S.W.2d 61 (Tex. 1983), which predates all the supreme court cases cited by Gharda. The selected language from *Kindred* is contrary to every causation decision from this Court in the last 20 years. *See, e.g., Mack Trucks, Inc. v. Tamez*, 206 S.W.3d 572, 581 (Tex. 2006) (holding that proof of causation in a products-

liability / fire case "requires expert testimony."); *see infra* at 26-27. If the language from *Kindred* is resurrected, it would seriously lower the bar for proving causation in a products case, even further than the other suggestions made by CSI and previously discussed. It hardly merits serious consideration.

II. The three required steps of CSI's fire-causation theory were not based on scientifically reliable evidence.

A. Step 1: CSI's contamination hypothesis was not supported by reliable evidence.

1. CSI cannot overcome the gap between the amount of EDC required to start the fire and the amount of EDC in the product.

Of the many gaps in CSI's asserted chain of causation, the most significant gap is between the percentage amount of EDC required for ignition and the amount of EDC that was proven to be in this product.

One end of the gap is the percentage of EDC in the product that was required to start a fire. Several percentages were in evidence:

- **20%**. The amount in Gharda's test that would ignite, but only for seconds. RR8:140-41.

- **10%**. The amount in Gharda's test that would not ignite, even when a flame was applied to the mouth of the beaker. RR139-140.

- **1.2 – 1.4%**. The amount that CSI's experts asserted, without testing, was required for the lower limit of flammability. RR5:112; RR6:164.

The only evidence supported by any testing was Gharda's test showing that more than 10% EDC was required for ignition. But even if CSI's experts' unsupported

assertions were accepted as reliable, CSI still would have to prove that the product contained at least 1.2% EDC.

The other end of the gap is the percentage of EDC that was proven to be in the product. EDC's brief does not point to any evidence of quantity. The only evidence in the record of the EDC amount in the product shipped to Gharda shows these amounts that are much less than 1.2%:

- **0.0000001% (1 part per billion)**. CSI's 3M Badge test two weeks after the fire detected trace amounts of EDC in only 8 of 32 drums through a test that detects amounts as remote as one part per billion. RR6:162-63; 5:45-47.

- **0 – 0.034%**. Tests by Gharda's experts of the retains (quantities saved as samples) of the five specific batches of the product that were shipped to CSI showed EDC levels ranging from 0 to a trace amount of 0.034%. RR9:25, 29.

The evidence proves, at most, an EDC quantity of .034%.

As one expert stated, there is a "huge gap" between 0.34% and the 1.2% of EDC required for ignition. RR9:25-26. To put these numbers another way, the best evidence to support this critical hypothesis in CSI's causation theory shows less than 3 percent of the EDC quantity necessary to meet its own experts' asserted threshold for flammability.

In an attempt to overcome this gap, CSI's Brief uses loose language to suggest that the amount of EDC was as high as 1%. But the record does not support this assertion:

What CSI's Brief Claims	**What the Record Actually States**
"The test [badge test of the vapors in the drums after the fire] identified *significant* levels of certain ignitable liquids, ethyl dichloride (EDC) and toluene." Response at 5 (emphasis added).	There is no evidence that the level of EDC was "significant." To the contrary, CSI's best evidence was that the tests showed a "lot of toluene" but only "detectible levels" of EDC. 5:186-87. The finding of toluene does support a defect theory since plaintiffs agree it is not created in Gharda's manufacturing process. R5:166, 187-88. And a "detectable level" of EDC under this test means as little as one part per billion. R6:162.
"…1% EDC would be expected according to the manufacturing specifications." Response at 25.	There is no evidence that the specifications provided for 1% EDC. To the contrary, Gharda's specifications provide that the product has 0.7% "inert ingredients" – not "flammable ingredients." RR6:45; RR13:PX8, p. 1. "Inert ingredients" refers to all components in the product that do not act as a pesticide. RR9:24; RR6:128-29. The 0.7% of inert ingredients includes a number of ingredients other than EDC, some in significantly greater quantities than EDC. RR6:127-29; 8:104-105. The "expected" level of EDC was less than 0.1% – not 1%. RR9:101; 8:96-97, 100-01, 104-05.
Gharda's data sheet and certificate of analysis "failed to disclose that the "on spec" product contains 1% flammable chemicals." Response at 34.	CSI cites no evidence that the product contained 1% "flammable" chemicals. At most, its expert testified that the product sold to CSI was "between 99 and 99.3 percent pure" and the remainder was "the garbage that's produced in the plant or from the manufacturing process." RR6:127. But its expert did not state, nor is there any other evidence, that all of the these other inert ingredients such as water, are flammable. *See, e.g.*, RR6:128-29.
"The EDC is reduced to 5% by	EDC is used in the beginning of the

distillation… and the process is repeated until EDC measures less than 1% of the product." Response at 34.	manufacturing process and then removed in multiple later stages until the ultimate amount is less than 1/10th of 1 percent. RR8:96-97, 100-101, 104-105.
If the "local grade" [94 % pure product sold in India] of the product "was shipped by mistake, there would have been 6% 'inert' flammable ingredients in the product." Response at 36.	Again, there is no support for the assertion that all or even most of the inert ingredients are flammable. To the contrary, CSI's expert testified only that two of the "eight or nine" impurities were flammable, and he noted that one of the other impurities is water. RR6:128-29. Regardless, there is no evidence whatsoever that CSI was shipped the local-grade product. In fact, the testing of the retains establishes that all of these batches of the product were within specifications. *See supra* at 12.

Despite CSI's rhetoric, there is no evidence that the quantity of EDC in these patches of product even approached the 1.2% that its own experts claimed was required for flammability.

2. CSI cannot be relieved of the burden to prove the quantity of EDC.

CSI asserts that it was not required to prove the quantities of contaminants in the burned remains. Response at 44. Even if true, it was CSI's burden to prove *somehow* that the quantity of EDC was so high that it caused the fire. "A plaintiff must prove that the product was defective when it left the hands of the manufacturer and that the defect was a producing cause of the plaintiff's injuries." *Ford Motor Co. v. Ridgway*, 135 S.W.3d 598, 600 (Tex. 2004)).

Evidence of quantity is essential. CSI's own expert admitted this when he testified that he could not say with reasonable probability that EDC was the cause without knowing the quantity of EDC in the product. RR5:112, 156-57. Proof of a harmful quantity is also required by Texas law. This Court has recognized, particularly in pharmaceutical and asbestos cases, that a plaintiff must prove that the "dose" was sufficient to cause the disease." *See, e.g.*, *Borg-Warner Corp. v. Flores*, 232 S.W.3d 765, 771-772 (Tex. 2007). Absent any evidence of the quantity of the harmful chemical, the jury cannot evaluate whether its quantity was sufficient to cause the injury. *Id*.

If, as CSI admits, the post-fire remains cannot prove the quantity of EDC before the fire, then the best evidence of that quantity is the retains – the samples retained by Gharda from each batch of the product that was shipped to CSI. RR9:7, 23. Every drum in the entire batch is sampled for analysis. *See* RR8:109, 112. Although the samples from the entire batch are combined before testing, the batch itself should be homogeneous because it is molten before being filled into individual drums and is continuously stirred. RR8:35, 91. As a result, it is "almost impossible" for a particular drum to have a unique composition from the rest of the batch. RR8:35-37. The retains were tested in 2005 when the product was produced and tested again after incident. RR8:125, 127-28.

CSI attacks the usefulness of the retains on various grounds – that the sample represent only a small portion of the whole batch and that some tests were performed after the incident and after the quality-control date had "expired." Response at 46. But CSI offers no reliable evidence that these factors would account for the huge gap between the amount of EDC found in the retains and the amount required for flammability. More importantly, CSI, which has the burden of proof, points to no other evidence of the quantity of EDC in these batches of product. CSI has not met its burden to prove the quantity necessary for causation.

3. CSI's minimal evidence of non-uniformity of the drums does not prove the required quantity of EDC or anything else.

Rather than addressing the quantity of EDC, CSI focuses on differences between the drums in the fire, particularly evidence that (1) some drums appeared to have burned hotter than others, and (2) the detection of trace amounts of EDC in the remains of some drums and not others. But there is no logical link between these differences in the drums and CSI's burden to show percentage of EDC that was high enough to start a fire.

Evidence that some drums burned more than others does not prove an excess amount of EDC. As both Gharda's expert and CSI's expert Cheremisinoff agreed, the difference in burning may be explained by other factors, such as the fact that the barrels near the outside were exposed to more oxygen. RR9:99. And no expert

testified that evidence of different degrees of burning among the drums would prove that any drums had contained EDC in an amount as high as 1.2%.

Similarly, the fact that trace amounts of EDC were found in 8 of the 32 drums in the hotbox after the fire is no evidence that any drum contained 1.2% EDC. This is true for several reasons. First, the device that detected EDC did not measure quantity and detected trace amounts as remote as one part per billion. RR6:42-43. So detection of EDC in a drum proved no more than one part per billion. There is no evidence that such a trace amount would support an inference that the pre-fire quantity of EDC was 1.2%.

Second, the fact that some barrels showed trace amounts of EDC after the fire and some did not can be explained by the fact that the testing of the retains showed that the level of EDC in the batches shipped to Gharda varied from 0 to 0.034%. RR9:25. But this proves nothing more than a slight variation of *trace* amounts of EDC from batch to batch. It is no evidence that any batch of EDC exceeded, or even came close to, the required quantity of 1.2%.

Third, CSI's brief never addresses its own experts' admissions that the presence of vapors detected in the badge test could have come from other sources, including the surrounding air in the industrialized area near the Houston Ship Channel where the barrels sat for two weeks between the date of the fire and the date of batch test. RR5:100, 104; 6:20, 41-42, 44-45.

At most, the evidence proves some minor variances in the level of trace amounts of EDC from one batch to the next. But there is no evidence of more than a minute quantity of EDC being present in any batch – and certainly nothing near the 1.2% contamination threshold that CSI's own experts asserted was the threshold for flammability.

4. A defective quantity of EDC cannot be inferred from the elimination of some other possible causes.

CSI's primary argument – and the reasoning of the court of appeals – is that even if the amount of EDC cannot be proven, it should be inferred from (1) its expert's conclusion that the fire began in the hot box, and (2) the elimination of some other possible causes. Response at 21; *Control Solutions*, 394 S.W.3d at 150. Even if its expert's conclusion about the origin of the fire were reliable, *see infra* at 27 - 28, Texas law does not countenance substituting a conclusion about location for evidence of causation.

In *Whirlpool*, this court rejected the same sort of expert inference that a dryer defect caused a fire based on evidence that the fire began in the dryer and the elimination of other possible causes. *Whirlpool Corp. v. Camacho*, 298 S.W.3d 631, 642-43 (Tex. 2009). Although this Court agreed that the fire-origin evidence was reliable that a fire began "in and around the dryer," it concluded that the evidence was insufficient to prove that the fire was caused by the product defect. *Id*. at 643. This Court emphasized that the plaintiff had not conducted "testing of

the critical aspects" of the expert's hypothesis of how the defect caused the fire. *Id.* at 642-43.

Nor does CSI's attempt to rule out a few other possible causes, such as electrical malfunction in the hotbox, support an inference that the alleged defect in Gharda's product caused this fire. The fire began in a 48,000 square-foot building filled with flammable solvents and hydrocarbons. RR3:39, 51-52, 164-66. An expert cannot prove a manufacturing defect merely by process of elimination because "[t[he universe of possible causes . . . is simply too large and too uncertain." *Cooper Tire & Rubber Co. v. Mendez*, 204 S.W.3d 797, 807-08 (Tex. 2006). The fallacy in that sort of reasoning is demonstrated by the initial findings of CSI's experts that the fire must have been caused by an excess quantity of a different chemical – toluene – until it was demonstrated that Gharda's manufacturing process could not produce that chemical. RR5:120-21, 166, 187-88, 213. But, if allowed to stand, the court of appeals opinion permits exactly this sort of fallacious reasoning and allows the inference of a defect and causation from a process of elimination.

5. At most, CSI proved no more than a possibility of excess EDC contamination – not a probability.

Another gap in CSI's proof is its inability to show, not that it was *possible* that Gharda's manufacturing procedures would result in at least 1.2% EDC, but instead that those procedures *probably* resulted in 1.2% EDC in this instance.

Again CSI's brief stretches the actual evidence about whether 1.2% EDC was probable or merely possible when citing Cheremisinoff's testimony. CSI asserts that Cheremisinoff's "ultimate opinion . . . was based upon 'reasonable scientific probability.'" Response at 37 (citing 6 RR 120-21, 131-33, 139-42, 147, 152). Yet when the pages in CSI's string-cite to the record are scrutinized, it becomes clear that he never testified that Gharda's manufacturing process made it *probable* that some product would be contaminated by 1.2% EDC.

First, several of the pages in the string-cite don't even use the word "probable":

- On pages 120-21, Cheremisinoff was *asked* whether the material in the hot box was contaminated with EDC "based on a reasonable scientific probability," RR6:120, but his *answer* was that he "determined, by reason of my analysis of the manufacturing process, that it was **possible** that product could be shipped with excess amounts of [EDC] in it." RR6:121. He did not testify that contamination was "probable." And he did not say even that "possible" contamination could rise to 1.2%.
- On pages 131-33, Cheremisinoff testified that "it was quite **possible**, well within scientific certainty, that there are manufacturing flaws that you **can** ship a product, that an operator **can** make an error, that you **could have** system failures like momentary blips on the vacuum system, . . . that you

could get solvents into the product." RR6:131-32. Based on this string of unproven hypotheticals he concluded only that "the manufacturing process itself has the **possibility** of introducing a wet [off-spec] product." RR6:133. Again, he does not mention quantity.

- On page 147, Cheremisinoff was asked the most likely cause of the fire, and answered, "I believe that the product contained an excess amount of ethylene dichloride, and that's the source of the incident." RR6:147. But this question and answer say nothing about the quantity of EDC, and nothing about reasonable scientific probability.

On several of the pages, Cheremisinoff answers affirmatively to a question in which CSI's lawyer uses the words "reasonable scientific probability." But none of those questions were about whether the quantity of EDC contamination would approach a level of 1.2%. *See* RR6:139 (whether "the sampling procedure employed by Gharda [was] inherently flawed . . . [because] . . . they take too few number of samples"); 6:142 (whether "this fire [could] have started without a defect in the Gharda chlorpyrifos technical?"); RR6:140 (whether "drums in the hot box were contaminated"). First, none of citations provide evidence that the product was contaminated with 1.2% EDC, or any other quantifiable amount, but only that it was "contaminated." This is no evidence that any hypothetical contamination would, or even could, rise to the level that CSI's expert said was

required for ignition. Second, when his testimony is read in its entirety, it becomes clear that Cheremisinoff did not find any actual contamination in any of Gharda's product, but based this opinion on his reading about Gharda's manufacturing process and his hypothesis of a possibility of human error resulting in contamination. *See generally* RR6:121, 130-133, 153-55, 169-70, 191. 206-07, 220-21. So even though he answers a question about his opinion based on reasonable scientific probability, that opinion is not supported by reliable evidence, but is merely the *ipse dixit* of the expert.

In the final citation, Cheremisinoff testified that there was a probability that EDC was in "a couple of drums." RR6:152. But that statement goes to the number of drums with some EDC; neither the question nor the answer concerns an amount of EDC above 1.2%.

Most importantly, Cheremisinoff was asked directly on cross-examination whether his opinion was that it was likely the product was off-spec, which would include an EDC amount well below the 1.2% threshold. RR6:220-21. He refused to make even that claim, instead saying only that "It's possible it will happen." RR6:220-21.

As previously mentioned, this is not just a matter of semantics or using magic words. The *substance* of the expert's testimony pointed to no more than a hypothetical possibility of excess EDC. To show a scenario where there could be

excess EDC contamination, Cheremisinoff had to hypothesize that "different sets of possible errors" at various stages in the manufacturing and quality control processes had occurred. RR6:130-31. In other words, for the amount of EDC to be excessive, multiple persons must make a serious of mistakes.

The reason that these multiple hypothetical errors are unlikely to result in excess EDC is Gharda's system of checks and controls. EDC is used at the beginning of the process, and reduced gradually in later manufacturing stages in which different tests are conducted that would identify an excess level of EDC. RR8:86, 94-96, 104, 113. As Cheremisinoff admitted, "there are multiple controls" to ensure the correct purity. RR6:129-30. But he reasoned, "there are **chances** to make mistakes." RR 6:130 (emphasis added). So, for instance, he hypothesized the possibility that an operator might make an error in reading gauges during manufacturing, and also the possibility that Gharda's quality control might not catch a problem drum. RR6:130-31, 134-35.

Cheremisinoff could do no more than speculate about possible EDC contamination. He never visited Gharda's plant. RR6:171. He could not identify any instance where Gharda had shipped the product with more than 1% EDC. RR169-170. He did not disagree with the method of testing of the retains, nor that those tests showed the retained amount from these batches were within specifications. RR6:221. And, most significantly, he conducted no tests. RR6:149,

150-51. Thus, the substance of his testimony amounts to no more than hypothetical speculation it was possible that Gharda's manufacturing and quality-control process could produce a product with excess EDC.

B. Step 2: CSI's ignition theories were not supported by testing or other reliable evidence.

1. CSI fails to address the reliability problems with its experts' ignition theories.

CSI's brief summarizes some of the testimony regarding its experts' theories of how this fire may have been ignited. Response at 28-29. But it fails respond to most of the reliability challenges raised by Gharda's Brief to this necessary step in its theory.

Conflicting theories. In its brief, CSI finally settles on a single theory of ignition – "spontaneous combustion." *Id*. But CSI does not deny that its own experts could not agree among themselves on possible ignition sources. For instance, although two of its other experts hypothesized that spontaneous combustion occurred, Cheremisinoff ruled out all theories of ignition other than static discharge. RR6:153-54, 196-99.

Flawed "negative corpus" reasoning. The disagreement among CSI's own experts highlights the fundamental problem with the method they used to determine an ignition source. CSI does not deny that all of its experts' ignition theories relied solely on "negative corpus" reasoning – the elimination of possible

causes – unsupported by any testing of ignition theories. CSI's brief nowhere responds to Gharda's explanation of why relying on this type of reasoning violates the Scientific Method and generates un-testable hypothesis. BOM at 29. As the conflict between CSI's own experts about ignition sources shows, the elimination of causes, standing alone, cannot reliably establish causation.

Absence of testing. CSI's brief attacks Gharda's testing, which showed that even a 10% level of EDC in the product will not ignite. Response at 29-30; RR8:139-140. It asserts, without explanation, that Gharda's test failed to duplicate the real conditions in the hotbox. Response at 30. But most importantly, CSI did no tests of its own to show that a 10% level of EDC, much less a 1.2% level of EDC, could ignite under real conditions. If CSI disagreed with Gharda's tests, it should have conducted its own tests, correcting the conditions about which it complained. It was CSI's burden – not Gharda's – to prove the reliability of its expert's ignition theories with testing. *See Whirlpool*, 298 S.W.3d at 639-40.

CSI similarly complains that "Gharda offered no alternative plausible cause." Response at 30. It is not difficult to speculate about other possible causes of a fire in a large warehouse filled with flammable solvents and hydrocarbons. RR3:39, 51-52, 164-66. But it was not Gharda's burden to prove a specific other cause. Rather, the burden was on CSI as the plaintiff to prove its theory of causation.

2. Proof of an ignition source is required.

Citing *Kindred v. Con/Chem, Inc.*, 650 S.W.2d 61, 63 (Tex. 1983), CSI argues that it need not prove a definitive source of ignition. Response at 30-31. There are two problems with CSI's argument.

First, Texas law has evolved since *Kindred* – a pre-*Robinson* case decided more than five years before Chief Justice Hecht joined the Court. In post-*Robinson* cases, this Court has required proof of an ignition source in order to establish the reliability of a fire-causation theory. *See, e.g., Mack Trucks, Inc. v. Tamez*, 206 S.W.3d 572, 581 (Tex. 2006) (expert's causation theory was not reliable absent "some methodology that reliably supported his opinions" regarding ignition); *Whirlpool*, 298 S.W.3d at 642-43 (rejecting expert's opinion as unreliable because of his failure to test his ignition theory).

Second, *Kindred*, is distinguishable because it involved a much simpler causal chain of causation. In *Kindred*, the evidence was that the primer at issue was a "very flammable mixture" that had been sprayed inside a tank where workers were sandblasting and vacuuming when ignition occurred. 650 S.W.2d at 61-63. The Court held that that evidence was sufficient to support an inference that the primer ignited without establishing exactly which source ignited that flammable mixture. *Id*. at 62.

Here, however, the evidence did not establish an inherently flammable product. Instead, CSI's experts had to rely on speculation: (1) to infer that Gharda may have made mistakes in manufacturing the product; (2) to infer that the quantity of the EDC in the product exceeded 1.2%; (3) to infer that Gharda's testing and quality-control process failed to catch the excess quantity of EDC; and (4) to infer that Gharda's product would spontaneously combust with a 1.2% quantity of EDC. This is a much more complex chain of inferences than the single inference in *Kindred*. Especially when Gharda's testing raised serious questions about whether a 1.2% quantity of EDC **could** ignite, it was CSI's burden to prove with testing its experts' ignition hypothesis. It did not do so.

C. Step 3: CSI's fire-origin theory was not supported by testing or other reliable evidence.

As with its theory of ignition, CSI's brief summarizes its experts' testimony regarding its theory of the fire origin. Response at 14-23. But it fails to respond to most of the reliability challenges raised by Gharda to this necessary step in its theory.

Failure to introduce the methodology of NFPA 921 into evidence. CSI's brief does not deny that it failed to introduce evidence, at trial or the *Robinson* hearing, to prove the requirements of NFPA 921, the methodology supposedly relied on by its fire-origin experts. Nor does CSI deny that the jury had to rely on the experts' bare assertion that their methodology followed NFPA 921. It was

CSI's burden to prove the basis of their methodology was reliable. *See E.I du Pont de Nemours v. Robinson & Co.*, 923 S.W.2d 549, 556 (Tex. 1995).

Lack of testing. CSI does not point to any testing to show that its experts' hypotheses were tested. CSI does not respond to the authorities that show that the proper application of NFPA 921 require testing. *See* BOM at 35 (citing authorities).

Failure to follow NFPA 921. CSI also does not respond to the evidence that showed its experts failed to meet the requirements of NFPA 921 in other ways. *See* BOM at 36-38.

Failure to reliably explain undisputed facts. Finally, CSI does not respond to the undisputed evidence that contradicts its experts' theories. *See* BOM at 38-39. For instance, it does not deny that the hot box was the part of the building that showed the *least* amount of fire damage, or that its own expert admitted that, under NFPA 921, the origin of a fire is likely to be the location with the greatest damages. RR5:67-68; 4:265-66. Nor does it address the undisputed fact that, after the fire, the drums showed no signs of explosion and each drum's cap remained on top of the drums. RR4:218, 268. This Court does not ignore undisputed facts that create a fatal gap in an expert's analysis or assertions. *Cooper Tire & Rubber Co. v. Mendez*, 204 S.W.3d 797, 804-05 (Tex. 2006).

D. All steps in CSI's causation theory rely on expert testimony unsupported by the *Robinson* factors.

CSI also mischaracterizes Gharda's point about the *Robinson* factors. Contrary to CSI's assertion, Gharda has never argued that "every one of these factors" must be met. Response at 8. Rather, the problem is that, for most steps of CSI's fire-causation theory, CSI does not show how any *Robinson* factor is met. Nor does CSI point any alternative indicia of reliability to show that its expert's opinions "are substantively more than merely the expert's conclusory, subjective opinion." *Whirlpool*, 298 S.W.3d at 642-43.

PRAYER FOR RELIEF

Petitioner Gharda respectfully requests this Court grant its petition for review, reverse the judgment of the court of appeals, and reinstate the trial court's take-nothing judgment.

Respectfully submitted,

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Based on a word count run in Microsoft Word 2007, this reply brief on the merits contains 6,972 words, excluding the portions of the brief exempt from the word count under Texas Rule of Appellate Procedure 9.4(i)(1).

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APPENDIX

Tab	Item
1.	*Mack Trucks, Inc. v. Tamez,* 206 S.W.3d 572 (Tex. 2006)
2.	*Control Solutions, Inc. v. Gharda USA, Inc*, 394 S.W.3d 127 (Tex. App.—Houston [1st. Dist.] 2012, pet. filed)
3.	*Cooper Tire & Rubber Co. v. Mendez*, 204 S.W.3d 797 (Tex. 2006)
4.	*Whirlpool Corp. v. Camacho*, 298 S.W.3d 631 (Tex. 2009)
5.	*Volkswagen of Am., Inc. v. Ramirez,* 159 S.W.3d 897 (Tex. 2004)
6.	*Kindred v. Con/Chem, Inc.*, 650 S.W.2d 61 (Tex. 1983)