

**DEC 6 2004**

**PATRICK FISHER**  
Clerk

**PUBLISH**

**UNITED STATES COURT OF APPEALS**

**TENTH CIRCUIT**

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FRED D. BITLER; PEGGY A.  
BITLER; COLORADO  
COMPENSATION INSURANCE  
AUTHORITY, a political subdivision  
of the State of Colorado,

Plaintiffs - Appellees,

v.

A.O. SMITH CORPORATION, a  
foreign corporation; NATIONAL  
PROPANE CORP., formerly known as  
All Seasons Propane, a Colorado  
corporation,

Defendants,

and

WHITE RODGERS, a subsidiary of  
EMERSON ELECTRIC CORP., a  
foreign corporation,

Defendant - Appellant.

No. 02-1527

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**Appeal from the United States District Court  
for the District of Colorado  
(D.C. Nos. 98-N-1897 and 98-BB-1897)**

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Daniel A. Nelson (Bruce A. Lampert, with him on the briefs), Schaden, Katzman,

Lampert & McClune, Broomfield, Colorado, for Plaintiffs-Appellees Fred and Peggy Bitler.

Andrew M. Low (Peter J. Krumholz, with him on the briefs), Davis, Graham & Stubbs LLP, Denver, Colorado, for Defendant-Appellant.

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Before **LUCERO**, **McKAY**, and **HARTZ**, Circuit Judges.

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**LUCERO**, Circuit Judge.

Danger lurked in Fred and Peggy Bitler’s basement, liability for which is the occasion for the present appeal. Mr. Bitler was severely burned when a gas explosion occurred in the basement of his home. On filing a products liability suit against, inter alia, White-Rodgers as manufacturer of the gas control installed in his basement water heater, a jury returned a verdict finding negligence and product defect and awarded damages to the Bitlers. White-Rodgers’ motions for JNOV and a new trial having been denied by the district court, the present appeal followed. In contesting the jury verdict imposing products liability on it for the explosion, White-Rodgers assigns as principal error the district court’s admission of plaintiffs’ expert testimony under Daubert principles. We exercise jurisdiction under 28 U.S.C. § 1291 and **AFFIRM**.

**I**

Fred and Peggy Bitler resided in a house provided for their use on the

Oldland Ranch outside of Meeker, Colorado where Fred Bitler was a ranch hand. On the evening of the accident, July 25, 1996, Bitler discovered that there was no hot water when he attempted to shower. Hot water was supplied to the Bitlers' home by a liquid propane hot water heater located in the basement. Donning sweat pants, he proceeded to the basement door, unlatched it, and walked approximately two-third's of the way down the staircase when a large explosion occurred, knocking him backwards. His wife, Peggy Bitler, was thrown off a sofa and onto the floor, which was later determined to have been raised several inches by the force of the explosion. Fred Bitler sustained severe burns, and after being flown by helicopter to a hospital, underwent multiple skin graft surgeries over the following weeks. It was established at trial that he has, in addition to general disfigurement, continuing problems with regulation of his body temperature, use of his hands, growth of hair follicles, and he will also need additional procedures in the future to develop nail growth on his hands. As a result of the injuries he sustained in this accident, he is no longer able to perform the duties appertaining to his former occupation as a cowboy and ranch hand.

There were three gas propane appliances in the Bitlers' home – a cook stove in the kitchen, a furnace in a bedroom, and a space heater in one of the bedrooms. Gas was supplied to the water heater via unsupported, flexible copper tubing that ran along the basement ceiling joints. A “T-fitting” was located above

the hot water heater which provided branches running to the hot water heater and the space heater. Post-accident inspection revealed a minor leak at the inlet to the bedroom heater, and a leak at the “T-connector.”

White-Rodgers, a subdivision of Emerson Electric Co., manufactured the water heater gas control used in the Bitlers’ hot water heater. This gas control regulates the flow of gas to the pilot and main burner of the water heater, and is designed to fulfill a crucial safety role if the pilot light is extinguished. To avoid a gas leak that could lead to an explosion or fire, the gas control is designed to shut off all gas flow to the pilot when the pilot is extinguished. As is well known, a lit pilot heats a thermocouple which in turn creates an electric current energizing an electromagnet that holds the safety valve open against the force of a spring. So long as the pilot is lit, the safety valve remains open. If the pilot goes out, however, the thermocouple will no longer be heated and will no longer produce a current to energize the electromagnet, allowing the spring to snap the valve shut. The safety valve seat is made of rubber, and is designed to create a seal against a circular metal surface when closed to prevent the flow of gas to the pilot.

Copper sulfide is a frequent contaminate found in gas and propane lines. If copper sulfide particles of sufficient size become lodged on a safety valve seat when a pilot is extinguished, the particles may prevent the valve from sealing,

resulting in a gas leak. It was established that numerous accidents have occurred in this manner, and that copper sulfide contamination was a significant source of concern for White-Rodgers. As a consequence, White-Rodgers modified the design of the safety valve in 1978 and began installing a wire mesh screen in the gas inlet, upstream from the safety valve to prevent copper sulfide particles from migrating onto the rubber valve seat. In further recognition of the safety hazard caused by copper sulfide contamination, White-Rodgers recalled all gas controls lacking the mesh screen in 1980. Thereafter, White-Rodgers also began adding another safety feature to the mesh screen by installing a deflection “baffle” to aid in preventing debris from reaching the valve and to hold the edges of the mesh screen in place more effectively. The safety valve installed in the Bitler’s water heater was one of about 200,000 devices produced in the interim that contained the mesh screen, but did not contain the baffle.

As a result of their investigations, plaintiffs’ expert Elden Boh concluded that the water heater was the source of the accident, and plaintiffs’ expert Donald Sommer concluded that the leak was caused by copper sulfide contamination on the water heater’s safety valve seat. Elden Boh is a fire investigator hired by the Colorado Farm Bureau, and Donald Sommer is an engineer and accident investigator retained by the Bitlers. Although White-Rodgers contests the admissibility of these two experts on appeal, plaintiffs’ expert W. Alan

Bullerdiek, a chemical engineer, also testified concerning the history of copper sulfide-contamination-related accidents, and that the amount of contamination found on the Bitlers' safety valve seat was at an unacceptable level.

During post-accident testing of the safety valve installed in the Bitlers' water heater, the device was disassembled in the presence of representatives of both White-Rodgers and the Bitlers. Copper sulfide particulate contamination was discovered downstream of the mesh screen and found on the safety valve seat. During the teardown, a test of the valve revealed that it snapped shut as designed. Plaintiffs' expert, Donald Sommer, opined at trial that a mix of copper sulfide particles and grease located on the safety valve seat caused the leak. Mr. Sommer testified that the valve seat was altered after the accident when the control was turned to the "off" position; furthermore, he testified that because copper sulfide contamination leads to intermittent leaks, the teardown test could not be determinative. Whether the particles found on the safety valve were large enough or of sufficient quantity to have caused the gas leak in the present case is hotly disputed.

Having marshaled their expert witnesses and having ruled out to their satisfaction all other sources of the gas leak save for the gas control on the water heater, the Bitlers filed suit in Colorado State Court against White-Rodgers, as well as A.O. Smith Corporation, which manufactured the water heater, and

National Propane Corporation, which installed and maintained the water heater and propane piping in the house. After removing the case to federal district court, defendants moved for summary judgment, contesting the admission of the plaintiffs' expert testimony as insufficiently reliable and lacking a firm foundation in science. In an order denying the motion, the trial judge found that the Bitlers' proposed expert testimony was relevant and reliable in accord with the standard required by Daubert v. Merrell Dow Pharms., Inc., 509 U.S. 579 (1993). The matter proceeded to a two-week jury trial, at the close of which the jury returned a verdict against White-Rodgers and National Propane, attributing fifty percent of the fault to National Propane and forty percent to White-Rodgers, and awarding \$2,319,492.27 in damages to the Bitlers. As to White-Rodgers specifically, the jury found both negligence and product defect. In its order of October 30, 2002, the district court denied White-Rodgers' motions for judgment as a matter of law and for a new trial. This appeal followed.

## II

We review de novo whether the district court properly performed its role as “gatekeeper” in admitting or excluding expert testimony. Dodge v. Cotter Corp., 328 F.3d 1212, 1223 (10th Cir. 2003) (“Though the district court has discretion in how it conducts the gatekeeper function, we have recognized that it has no discretion to avoid performing the gatekeeper function.”). We review for abuse

of discretion the manner in which the district court exercises its Daubert “gatekeeping” role in making decisions whether to admit or exclude testimony. General Elec. Co. v. Joiner, 522 U.S. 136, 139 (1997). We will not, however, disturb a district court’s ruling absent our conviction that it is arbitrary, capricious, whimsical, manifestly unreasonable, or clearly erroneous. Goebel v. Denver and Rio Grande W. R.R. Co., 346 F.3d 987, 990 (10th Cir. 2003). The district court must, however, make specific factual findings on the record which are sufficient for an appellate court to review the trial court’s conclusion concerning whether the testimony was scientifically reliable and factually relevant. Dodge, 328 F.3d at 1223. Our standard of review of a trial court’s factual findings in pursuit of its gatekeeping role does not vary when examining exclusion or admission of expert testimony. Our focus on review mirrors that of the trial judge’s assessment of the testimony itself: we are concerned with the trial court’s performance of its obligation under Rule 702 and Daubert, not upon the exact conclusions reached to exclude or admit expert testimony. See Goebel, 346 F.3d at 1001 (holding that district court did not abuse its discretion in admitting expert testimony); Mitchell v. Gencorp Inc., 165 F.3d 778, 784 (10th Cir. 1999) (holding that the district court did not abuse its discretion in excluding expert testimony). Thus, although the district court “must, on the record make some kind of reliability determination,” United States v. Velarde, 214 F.3d 1204,

1209 (10th Cir. 2000), we recognize the wide latitude a district court has in exercising its discretion to admit or exclude expert testimony.

## A

White-Rodgers assigns as a principal source of error the district court's performance of its Daubert gatekeeping functions. We begin our inquiry into the admissibility of the Bitlers' expert testimony with Fed. R. Evid. 702. In accord with Rule 702, the Supreme Court has determined that the trier of fact "must ensure that any and all scientific testimony or evidence is not only relevant, but reliable." Daubert, 509 U.S. at 589. To fulfill its gatekeeping role, a district court must therefore conduct a two-part inquiry.

First, a district court must determine if the expert's proffered testimony – whether it concerns scientific, technical, or other special knowledge – has "a reliable basis in the knowledge and experience of his [or her] discipline." Id. at 592; see also, Kuhmo Tire Co. v. Carmichael, 526 U.S. 137, 149 (1999) (holding that Daubert's general principles apply to all expert matters under Rule 702). By conducting a preliminary inquiry into the expert's qualifications and the admissibility of proffered evidence, a district court fulfills its initial obligation under Fed. R. Evid. 104(a) ("Preliminary questions concerning the qualification of a person to be a witness . . . or the admissibility of evidence shall be determined by the court"). To determine whether expert testimony is admissible

requires a trial court to examine “whether the reasoning or methodology underlying the testimony is scientifically valid . . . .” Daubert, 509 U.S. at 592-93. In order to establish an expert’s testimony as reliable, we have held that:

The plaintiff need not prove that the expert is undisputably correct or that the expert’s theory is “generally accepted” in the scientific community. Instead, the plaintiff must show that the method employed by the expert in reaching the conclusion is scientifically sound and that the opinion is based on facts which sufficiently satisfy Rule 702’s reliability requirements.

Mitchell, 165 F.3d at 781 (citation omitted).

Providing guidance as to the kinds of factors that might bear on a judge’s gatekeeping determination, the Supreme Court has suggested that a court consider: (1) whether a theory has been or can be tested or falsified, (2) whether the theory or technique has been subject to peer review and publication, (3) whether there are known or potential rates of error with regard to specific techniques, and (4) whether the theory or approach has “general acceptance.” Daubert, 509 U.S. at 593-94. The Court has made clear, however, that this list is neither definitive nor exhaustive and that a trial judge has wide discretion both in deciding how to assess an expert’s reliability and in making a determination of that reliability. Kuhmo Tire Co., 526 U.S. at 150, 152-53; see also Velarde, 214 F.3d at 1208-09. While these factors are most relevant in the context of a new and novel scientific theory – asking if it has been tested, subjected to peer review and publication, etc. – they do provide examples of the general kinds of issues a

trial court need probe in light of its purpose of ensuring that an expert “employs in the courtroom the same level of intellectual rigor that characterizes the practice of an expert in the relevant field.” Kumho Tire, 526 U.S. at 152. Failure to consider one, or even any, of these factors, albeit suggestive, will not be dispositive of a district court’s failure to fulfill its gatekeeping role because that role depends on the underlying factual circumstances of the particular case.

Accordingly, a trial court’s focus generally should not be upon the precise conclusions reached by the expert, but on the methodology employed in reaching those conclusions. Daubert, 509 U.S. at 595. Although it is not always a straightforward exercise to disaggregate method and conclusion, when the conclusion simply does not follow from the data, a district court is free to determine that an impermissible analytical gap exists between premises and conclusion. See Joiner, 522 U.S. at 146; Dodge, 328 F.3d at 1222. When examining an expert’s method, however, the inquiry should not be aimed at “the exhaustive search for cosmic understanding but for the particularized resolution of legal disputes.” Daubert, 509 U.S. at 597.<sup>1</sup> Thus it is the specific relation

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<sup>1</sup> Determining whether proffered testimony is scientifically reliable can be a considerable challenge for a trial judge. As Justice Breyer has noted, “this requirement will sometimes ask judges to make subtle and sophisticated determinations about scientific methodology and its relation to the conclusions an expert witness seeks to offer – particularly when a case arises in an area where the science itself is tentative or uncertain. . . .” Joiner, 522 U.S. at 147-48

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between an expert’s method, the proffered conclusions, and the particular factual circumstances of the dispute, and not asymptotic perfection, that renders testimony both reliable and relevant.

Second, in fulfilling its Daubert obligations a trial court must also conduct a further inquiry into whether proposed testimony is sufficiently “relevant to the task at hand.” Daubert, 509 U.S. at 597. Relevant evidence “means evidence having any tendency to make the existence of any fact that is of consequence to the determination of the action more probable or less probable than it would be without the evidence.” Fed. R. Evid. 401. The Supreme Court has described the consideration of relevant evidence as one of “fit.” Daubert, 509 U.S. at 591. A trial court must look at the logical relationship between the evidence proffered and the material issue that evidence is supposed to support to determine if it advances the purpose of aiding the trier of fact. Even if an expert’s proffered evidence is scientifically valid and follows appropriately reliable methodologies, it might not have sufficient bearing on the issue at hand to warrant a determination that it has relevant “fit.” Id. Testimony concerning the laws of

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<sup>1</sup>(...continued)  
(Breyer, J., concurring). To fulfill this task, however, as Judge Posner has observed, “we do not have to become philosophers of science and set forth the necessary and sufficient conditions of ‘real’ science,” or endeavor to discover “the essence of ‘science,’ if there is such an essence.” Rosen v. Ciba-Geigy Corp., 78 F.3d 316, 318 (7th Cir. 1996). We may leave the philosophy of science to the philosophers.

quantum mechanics may be scientifically relevant, but may have no practical relevance to testimony concerning the function and possible failure of a water heater safety valve control. Evidence appropriate for one purpose, therefore, may not be relevant for a different purpose, and it is the trial court's task to make this fitness determination.

## **B**

In fulfilling its Daubert gatekeeping function, the district court, in its order denying summary judgment to the defendants, focused on two expert witnesses proposed by the Bitlers: Elden Boh and Donald Sommer. On reviewing the record, we note that the actual testimony offered at trial does not differ in material respects from either Boh's or Sommer's depositions as analyzed by the district court on motions for summary judgment. Nonetheless White-Rodgers argues that the magistrate judge was required to perform a gatekeeping role by entertaining anew, during pre-trial proceedings, defendant's objections to the testimony of Sommer; the magistrate judge instead treated District Judge Nottingham's order denying summary judgment as law of the case, and refused to consider de novo the issue of whether to admit the Bitlers' expert testimony. It is clear, however, that because White-Rodgers did not raise new issues concerning the reliability of the Bitlers' expert witnesses, the district court did not fail to perform its Daubert role merely by refusing to reconsider the question of

admissibility that had already been decided. Daubert does not require a district court to linger at the “gate,” as if caught in Zeno’s paradox, unable to proceed to the main trial without first conducting a series of mini-trials with regard to every objection raised against a party’s expert witnesses.

As to reliability regarding Boh’s testimony, the district court specifically found that Boh’s methodology in reaching his conclusion about the cause of the explosion was sound. Employing his experience and knowledge as a fire investigator, Boh observed the physical evidence at the scene of the accident and deduced the likely cause of the explosion. Although such a method is not susceptible to testing or peer review, it does constitute generally acceptable practice as a method for fire investigators to analyze the cause of fire accidents. See Kumho Tire Co., 526 U.S. at 150 (“the relevant reliability concerns may focus upon personal knowledge or experience”). Nothing in Rule 702 or Daubert requires more. We conclude that the trial court did not abuse its discretion in finding Boh’s personal experience, training, method of observation, and deductive reasoning sufficiently reliable to constitute “scientifically valid” methodology.

With regard to the testimony of Donald Sommer, as well as other experts testifying for the Bitlers, White-Rodgers argues that his testimony constituted impermissible speculation because he failed to test his theory that copper sulfide particles passed through and around the mesh screen to lodge on the safety valve

seat and thereby cause the gas leak. Furthermore, White-Rodgers argues that Sommer's theory fails to "fit" the known facts that no particles of sufficient size to cause a leak were found on the seat of the valve. Finally, White-Rodgers contests the reliability of the so-called "differential diagnosis" method Sommer employed.

We turn to the issue whether the Bitlers' experts, particularly Sommer, were required to test their theory. No doubt, Daubert noted that a key factor in valid scientific methodology is the practice of testing hypotheses to determine whether they can be falsified. Daubert, 509 U.S. at 593 (citing Karl Popper, Conjectures and Refutations: The Growth of Scientific Knowledge (5th ed. 1989), who emphasized the importance of testing scientific theories to determine whether they can withstand critical scrutiny). One object of Popper's method of falsification as a way of testing a scientific theory is to acknowledge that any scientific theory is subject to future refutation through further observation and testing. Popper's emphasis, however, is aimed at theories purporting to explain the causal relations among regularly occurring natural phenomena. (Ptolemy's theory of the movement of celestial bodies which hypothesized that the Earth was the center of the solar system, later falsified by Copernicus, is a prominent example of such a scientific theory subject to falsification by further inquiry.) Although we would not conclude from the citation to Popper, or the logical

positivist Carl Hempel, *id.* at 593, that the Supreme Court intended to limit a district court's consideration of whether testing would assist the trier of fact only to those instances of scientific knowledge aimed at such causal relations, we do find the emphasis suggested by the citations instructive.

For example, in Truck Ins. Exch. v. Magnetek Inc., 360 F.3d 1206, 1211-1212 (10th Cir. 2004), plaintiff attempted to introduce evidence of a novel theory, "pyrolysis," which hypothesized that wood could ignite at temperatures much lower than normal under particular circumstances. We affirmed the district court's decision to exclude this evidence because plaintiff's experts had failed to test their novel theory sufficiently to demonstrate its scientific reliability. *Id.* at 1213. When an expert proposes a theory that modifies otherwise well-established knowledge about regularly occurring phenomenon, such as the normal ignition temperature of wood, we would expect the importance of testing as a factor in determining reliability to be at its highest. Here, by contrast, plaintiffs' experts propose a theory about how the accident occurred given the known science of copper sulfide particulate contamination as a cause of propane gas leaks. What distinguishes the present case is that the need for testing is not at its highest because the reliability of the science of copper sulfide contamination is not in dispute, and thus the district court did not abuse its discretion in finding that the presence of a screen did not alter the reliability of the fundamental science.

Whether the Bitlers established that the copper sulfide particles and grease found on the valve seat caused this accident is a matter the district court determined goes to the sufficiency of the evidence – not its scientific reliability. Defendants misunderstand what is at stake in a reliability analysis when they claim that the mere addition of a screen fundamentally and necessarily changed the nature of the underlying science such that the district court abused its discretion in admitting plaintiffs’ expert testimony. No doubt, presence of the screen changed the causal analysis the jury was required to conduct based on the conflicting evidence presented, but the presence of a screen did not change the analysis into one that necessarily required further testing to determine its scientific reliability. The core science – that copper sulfide particles are the kind of thing that when lodged on the valve seat can cause leaks – is sufficiently well-established that the district court did not abuse its discretion in finding it reliable. The core dispute – whether copper sulfide particles found on the valve seat in this case were sufficient to cause a leak – is one the district court could properly determine is a question for the jury. In light of this evidentiary dispute, the Bitlers need only establish by a preponderance of the evidence that copper sulfide particles caused the gas explosion in their basement. See, e.g., Kaiser Found. Health Plan v. Sharp, 741 P.2d 714, 719 (Colo. 1987). Had their experts conducted further tests on their water heater’s safety valve and established by

observation that it did intermittently fail, they may have established causation to a near certainty. But such a high degree of certainty is not required.<sup>2</sup> Thus, because testing is not necessary in all instances to establish reliability under Daubert, and because the district court reasonably found that it was not required by the particular factual circumstances of this case, we conclude that the district court did not abuse its discretion in admitting the Bitlers' experts' testimony.

With regard to White-Rodgers' argument that the Bitlers' experts impermissibly relied on a method of "differential diagnosis," we note that the term is being used analogically to its proper use in a medical context; nonetheless, we conclude that in this circumstance it is a valid scientific technique to establish causation.<sup>3</sup> Concerning the method he employed in his investigation, Sommer

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<sup>2</sup> As to alleged shortcomings of the proffered testimony, these go to "the weight which the trier of fact should accord the evidence and do not make the testimony incredible." Orth v. Emerson Elec. Co., 980 F.2d 632, 637 (10th Cir. 1992). Nowhere does Rule 702 or Daubert require a finding that an expert's proffered testimony reach absolute certainty with regard to the likely truth of a conclusion. See Daubert, 509 U.S. at 590 ("Of course, it would be unreasonable to conclude that the subject of scientific testimony must be 'known' to a certainty; arguably, there are no certainties in science.").

<sup>3</sup> Urging us to adopt the analysis in Stibbs v. Mapco, 945 F.Supp. 1220 (D. Iowa 1996), which also involved a LP gas explosion implicating one of their controls, White-Rodgers argues that the inference involved in differential diagnosis "turns scientific analysis on its head." Id. at 1226. We reject this reasoning as itself fundamentally unsound as we explain infra. Furthermore, we adopt the district court's apt analysis distinguishing Stibbs on its facts from the present case – viz., in Stibbs the plaintiff's evidence consisted of a mark on the safety valve and the absence of a leak elsewhere, with no evidence of debris

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testified that he undertook a process of eliminating alternative possible causes, determining that these possibilities were improbable sources of the explosion, and arriving at a highly probable cause for the gas leak, calling it a method of “differential diagnosis.” “Differential diagnosis,” is “the determination of which of two or more diseases with similar symptoms is the one from which the patient is suffering, by a systematic comparison and contrasting of the clinical findings.” Stedman’s Medical Dictionary 492 (27th ed. 1995).<sup>4</sup> In the medical context, differential diagnosis is a common method of analysis, and federal courts have regularly found it reliable under Daubert. Goebel, 346 F.3d at 999 (concluding that a district court may admit a differential diagnosis it determines is reliable); Westberry v. Gislaved Gummi AB, 178 F.3d 257, 262 (4th Cir. 1999) (holding that differential diagnosis is a reliable technique “of identifying the cause of a medical problem by eliminating the likely causes until the most probable one is isolated”); Clausen v. M/V New Carissa, 339 F.3d 1049, 1058-59 (9th Cir. 2003) (recognizing differential diagnosis as a reliable method); Zuchowicz v. United States, 140 F.3d 381, 387 (2d Cir. 1998) (upholding district court decision to

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<sup>3</sup>(...continued)  
downstream nor testimony as to how debris could have migrated past the screen.

<sup>4</sup> Used in its traditional medical sense, the term refers “to the diagnosis of disease, and refers to the process of identifying external causes of diseases and conditions as ‘determining cause’ . . . as the circumstances warrant.” Federal Judicial Center, Reference Manual on Scientific Evidence 444 (2d ed. 2000).

admit differential diagnosis testimony). What is not so clear is whether “differential diagnosis” is an appropriate method when employed outside of the medical context.

Here, however, the Bitlers’ experts use a general method more aptly characterized as a process of reasoning to the best inference.<sup>5</sup> The Bitlers’ experts must reason, as it were, backwards to the cause of a single explosion, and to do so requires a process of eliminating possible causes as improbable until the most likely one is identified. For example, Sommer and Boh both testified to how they eliminated the gas leaks in the bedroom and the T-connector above the water heater as likely sources of the accident; the one was not located close enough to the source of the explosion, and the other was itself most likely the result of trauma caused by the explosion. Sommer testified that the force of the explosion lifted the house off its foundation, and accordingly, was the most probable cause of the leak at the T-connector, especially in light of its damaged physical condition. Experts must provide objective reasons for eliminating alternative causes when employing a “differential analysis.” See Clausen, 339 F.3d at 1058.

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<sup>5</sup> Unlike a logical inference made by deduction where one proposition can be logically inferred from other known propositions, and unlike induction where a generalized conclusion can be inferred from a range of known particulars, inference to the best explanation – or “abductive inferences” – are drawn about a particular proposition or event by a process of eliminating all other possible conclusions to arrive at the most likely one, the one that best explains the available data.

Furthermore, the inference to the best explanation must first be in the range of possible causes; there must be some independent evidence that the cause identified is of the type that could have been the cause. See Joiner, 522 U.S. at 146 (“[N]othing in either Daubert or the Federal Rules of Evidence requires a district court to admit opinion evidence that is connected to existing data only by the ipse dixit of the expert.”). But more than mere possibility, an inference to the best explanation for the cause of an accident must eliminate other possible sources as highly improbable, and must demonstrate that the cause identified is highly probable.<sup>6</sup> In the present case, it is uncontroverted that if copper sulfide particles of sufficient size became lodged on the safety valve seat, then a gas leak substantial enough to cause the explosion in the Bitlers’ basement could occur. Whether or not that actually occurred is a question that may be answered by inference to the best explanation.<sup>7</sup> We see no abuse of discretion, especially in

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<sup>6</sup> An expert must show that other causes are improbable when conducting differential diagnosis, but “[t]his is not to say that an expert, in order to testify on causation, must be able to categorically exclude each and every possible alternative cause. . . .” – to require otherwise “would mean that few experts would ever be able to testify.” Stephen A. Saltzburg et al., Federal Rules of Evidence Manual 702–33 (8th ed. 2002). Indeed, “the underlying premise of differential diagnosis is that there is an established connection between certain possible causes and a condition or symptom—then all of the established causes are ruled out but one.” Id. at 702–35.

<sup>7</sup> As Judge Kozinski noted on remand in Daubert: “Not knowing the mechanism whereby a particular agent causes a particular effect is not always fatal to a plaintiff’s claim. Causation can be proved even when we don’t know  
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light of our deferential standard of review, in the district court’s admitting expert testimony that employs an expert’s physical investigation, professional experience, and technical knowledge to establish causation in this case.

Finally, as to the “fit” between the expert testimony and the material issue at stake in this case, White-Rodgers argues that the theory of copper sulfide particulate contamination does not “fit” the facts that the safety valve at issue is a screened valve, and no screened valve had ever been shown to allow sufficient copper sulfide downstream so as to cause a gas leak; furthermore, the valve functioned properly when tested after the accident. This argument confuses a Daubert inquiry into relevant “fit” with the jury question of which theory, plaintiffs’ or defendant’s, best captures the truth of the matter at issue. The former inquiry is aimed at determining if “a valid scientific connection to the pertinent inquiry,” Daubert, 509 U.S. at 592, obtains as a precondition to the admissibility of expert testimony. Here, the expert testimony “fits” because it involves a reliable method that would aid the jury in resolving a factual dispute; whether the jury finds that the testimony “fits” their best assessment of the truth of the matter is an altogether different issue. Accordingly, the district court did

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<sup>7</sup>(...continued)  
precisely how the damage occurred, if there is sufficiently compelling proof that the agent must have caused the damage. . . .” Daubert v. Merrell Dow Pharm., 43 F.3d 1311, 1314 (9th Cir. 1995).

not abuse its discretion in admitting the Bitlers' expert testimony.

Thus, in summation, we conclude that in fulfilling its gatekeeping role pursuant to the Federal Rules of Evidence and Daubert, the district court did not abuse its discretion in making its "preliminary assessment of whether the reasoning or methodology underlying the testimony is scientifically valid and of whether that reasoning or methodology properly can be applied to the facts in issue." Daubert, 509 U.S. at 592-3.

### III

White-Rodgers argues on appeal that safety valve models lacking an inlet screen are substantially dissimilar from models containing the mesh screen and therefore the district court abused its discretion in admitting plaintiff's evidence of accidents involving the unscreened devices.

At trial, the Bitlers introduced evidence of accidents which involved a model of safety valves exactly the same as the one in the Bitlers' water heater save for the absence of the inlet screen. These accidents occurred when copper sulfide particles contaminated the safety valve of unscreened safety controls, preventing the valve from closing fully and resulting in a gas leak. The purpose of this evidence was to demonstrate a key element of the Bitlers' theory of causation: if copper sulfide particles are allowed downstream to contaminate the valve seat, then the safety valve system could fail. Furthermore, the Bitlers argue

that this evidence was necessary to prove notice to White-Rodgers of the potential for their safety valves to fail.

In response, White-Rodgers contends that they offered to stipulate to the failures of the unscreened device, and that therefore the admission of evidence involving accidents with unscreened controls was irrelevant. Although White-Rodgers admits that copper sulphide particles can cause leaks in unscreened models, they argue that there has been no demonstration that screened models are susceptible to sufficient contamination to cause leaks; therefore, they suggest that the presence of a screen makes the Bitlers' safety control substantially dissimilar to unscreened devices. Moreover, because these other accidents involving unscreened controls resulted in injuries and deaths, White-Rodgers argues that the evidence was inherently prejudicial.

We review a district court's decision to admit evidence for abuse of discretion. Smith v. Ingersoll-Rand Co., 214 F.3d 1235, 1246 (10th Cir. 2000). As a threshold matter, we will admit evidence of prior accidents in a products liability suit if it is relevant to the present inquiry. Id. To determine relevancy, we must examine whether there is substantial similarity between the evidence offered of prior accidents and the facts at issue in the present case. "Before introducing such evidence, the party seeking its admission must show the circumstances surrounding the other accidents were substantially similar to the

accident involved in the present case.” Wheeler v. John Deere Co., 862 F.2d 1404, 1407 (10th Cir. 1988); Black v. M & W Gear Co., 269 F.3d 1220, 1227 (10th Cir. 2001). Determining whether and to what extent proffered evidence of prior accidents involves substantially similar circumstances will depend on the underlying theory of the case advanced by the plaintiffs. If the evidence of other accidents is substantially similar to the accident at issue in a particular case, then that evidence will assist the trier of fact by making the existence of a fact in dispute more or less probable, and the greater the degree of similarity the more relevant the evidence. See Four Corners Helicopters, Inc. v. Paton, 979 F.2d 1434, 1440 (10th Cir. 1992). Naturally, this is a fact-specific inquiry that depends largely on the theory of the underlying defect in a particular case. Id. Accordingly, the district court is owed considerable deference in its determination of substantial similarity.

With regard to the Bitlers’ proposed evidence of accidents involving unscreened devices, the district court ruled that these prior accidents involved substantially similar devices to the one involved in the present accident, and accordingly denied the defendant’s motion in limine to exclude. In order to demonstrate notice and the existence of a defect, namely the consequences of copper sulfide contamination, the district court ruled that exact similarity between the devices was not required and its absence would not compel exclusion. We

have routinely held that federal law permits introduction of substantially similar accidents to show notice, the potential existence of a defect, or to refute defense witness testimony. Four Corners Helicopters, Inc., 979 F.2d at 1440.

In light of the plaintiffs' purposes of showing notice and defect, we do not require a showing of exact similarity, and hence we cannot conclude that the district court erred in admitting evidence it found substantially similar given the circumstances surrounding the Bitlers' accident. In order to demonstrate that copper sulfide particles were capable of causing a gas leak when contaminating the safety valve seat, it was reasonable and relevant for the plaintiffs to introduce evidence of failures in substantially similar devices under substantially similar circumstances. If contamination could cause gas leaks absent an inlet screen, then if the plaintiffs could show that particles could get through or around the screen – the essence of the plaintiffs' case – it would be reasonable for jurors to make a determination as to causation in the present case. Offering evidence that the industry was aware as early as 1967 that copper sulfide contamination could be a problem for gas control valves served the purpose of demonstrating notice to White-Rodgers and of highlighting the potential existence of a defect – part of the underlying theory of the plaintiff's case which goes to establish a standard in this case for “how substantial the similarity must be. . . .” Ponder v. Warren Tool Corp., 834 F.2d 1553, 1560 (10th Cir. 1987) (citation omitted). Indeed, the

district court found that the similarity between the two models of safety valves, for purposes of the trial, was not only substantial, but constituted a “high degree of similarity” in light of other evidence demonstrating that even with the screen, copper sulfide particles were found downstream from the screen. (4 R. at 967.)

We see no error in the district court’s finding. Accordingly, we hold that the district court did not abuse its discretion in admitting evidence of prior accidents involving unscreened safety valves.

#### IV

White-Rogers argues that the district court erred by giving a jury instruction on failure to warn of known and non-obvious defects in its safety valve. Whether a jury was properly instructed in accord with the applicable law and consistent with matters properly within its province is a question we review de novo. Gardetto v. Mason, 100 F.3d 803, 816 (10th Cir. 1996). However, we will review for abuse of discretion a district court’s exercise of its discretion in giving a particular jury instruction. Hynes v. Energy West, Inc., 211 F.3d 1193, 1197 (10th Cir. 2000).

Arguing that the issue of a duty to warn was not supported by the evidence, and hence not a matter properly submitted to the jury, White-Rodgers objects to the district court’s presentation of the following instruction to the jury:

If A.O. Smith and White-Rodgers, a wholly-owned division of Emerson Electric, as manufacturers or sellers of a product know or in the exercise of

reasonable care should know that the use of the product may be harmful or injurious to a user, and such risk of harm or injury is not obvious to a reasonable user, then the manufacturer and seller must use reasonable care to warn the user of the risk of harm or injury if a reasonably careful person would under the same or similar circumstances. The failure to do so is negligence.

(13 R. at 3525.)

As a threshold matter, we are persuaded that White-Rodgers' assignment of error to the district court's jury instruction on a duty to warn is not properly preserved for appeal. At trial, White-Rodgers objected generally to the jury instruction concerning a duty to warn, arguing only that there is neither a basis for, nor an issue of, a failure to warn.<sup>8</sup> Defendant further objected that plaintiffs failed to establish any evidence for the instruction. Rejecting White-Rodgers' inchoate objections, the district court found "that there is evidence sufficient to allow the jury to determine that White-Rodgers knew prior to this accident of the migration of copper sulfide around the screen only device, which the jury could conclude required a duty to warn." (12 R. at 3057-58.)

On appeal, White-Rodgers now asserts that the jury instruction on a failure to warn was error because plaintiffs presented no evidence of proximate causation. Specifically, Appellant now argues that plaintiffs provided no evidence that a

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<sup>8</sup> White-Rodgers' counsel opined generally: "If the product is found to be defective then I guess liability exists. I don't know what we're supposed to warn them about." (11 R. 2995.)

warning would have been effective or what the content of that warning would have been. However, at trial Appellants did not raise an objection as to proximate causation distinctly and did not identify specifically the grounds of the objection before the district court as required by Fed. R. Civ. P. 51(c)(1) (“A party who objects to an instruction or the failure to give an instruction must do so on the record, stating distinctly the matter objected to and the grounds of the objection.”); see also Hynes, 211 F.3d at 1200. White-Rodgers failed to make abundantly clear the grounds and basis for its objection to the jury instruction on a failure to warn, objecting instead in general terms that there was no issue of warning. See Weir v. Fed. Ins. Co., 811 F.2d 1387, 1390 (10th Cir. 1987) (noting that Rule 51 “requires counsel to make abundantly clear to the trial court the objecting party's position”) (quotation omitted). To preserve an objection for appeal, it is not enough for an objecting party merely to raise an objection. Instead, the “grounds stated in [an] objection must be obvious, plain, or unmistakable.” Id. (citation omitted); see also, Medlock v. Ortho Biotech, Inc., 164 F.3d 545, 553 (10th Cir. 1999) (noting that “an excessively vague or general objection to the propriety of a given instruction is insufficient to reserve the issue for appeal”).

Accordingly, because White-Rogers’ objections were not properly specific, the issue of supposed error in the district court’s jury instruction regarding failure to warn is not properly preserved for appeal.

## V

In the alternative, failing success on its argument to reverse the jury verdict, White-Rodgers argues that the jury award of \$150,000 for future wage loss and \$75,000 for future medical expenses was not supported by any evidence. When we review a jury's award of damages, we will sustain the award unless it is clearly erroneous or there is no evidence to support the award. Hudson v. Smith, 618 F.2d 642, 646 (10th Cir. 1980); Brown v. Presbyterian Healthcare Servs., 101 F.3d 1324, 1330 (10th Cir. 1996).

With regard to the evidence of future wage loss, Mr. Bitler provided tax returns for the years prior and subsequent to the accident and provided testimony concerning his current employment prospects. There is no doubt that evidence was presented that his earnings have declined as a consequence of the accident, and that although he remains employable in some settings, his employment prospects have been substantially diminished. Furthermore, evidence was also offered of benefits he received as a ranch hand, but no longer receives, such as use of the furnished house where the accident occurred and a replacement heifer worth \$850, that go beyond his salary as reflected by his tax returns. In light of our highly deferential stance regarding jury determinations of damages, we cannot say that there was no evidence presented to support a jury finding of future lost wages in the amount of \$150,000.

Concerning the evidence of future medical expenses, there is no doubt that physician testimony and Mr. Bitler's testimony did not establish precise costs of any future procedures. One physician testifying, Dr. Hartford, described past problems with infections involving Mr. Bitler's skin grafts, and acknowledged a possibility of future infections. Mr. Bitler's plastic surgeon, Dr. Gordon, testified to the future need for procedures to develop Mr. Bitler's fingernails, which Bitler has elected to defer to a later time. (3 R. at 768.) Plaintiff argues that the jury could reasonably estimate future medical expenses based on the stipulation by the parties to past medical expenses. Clearly, such a basis for determining an award for future medical expenses is imprecise and on review is not based on specific and substantial evidence. But we do not review for substantial evidence; rather, we review for clear error whether there is any evidence to support the jury finding. Despite some estimation in the jury's award for future medical expenses, we cannot conclude, in light of our deferential review, that there is no evidence to support the award or that it was clearly erroneous.

Therefore, as to the jury awards for future wage loss and future medical expenses, we affirm.

## VI

With regard to the final issue in White-Rodgers' appeal, appellant argues that the jury award of \$25,000 for Mrs. Bitler's physical and emotional injury was

excessive. Specifically, White-Rodgers argues that negligent infliction of emotional harm was not pled, and because Mrs. Bitler suffered only minor physical injuries in the accident, that the jury award is clearly excessive. We disagree. As appellant concedes, Mrs. Bitler may recover emotional injuries that flow from her own physical injuries. See, e.g., Williams v. Continental Airlines, Inc., 943 P.2d 10, 16 (Colo. App. 1996). Because the circumstance surrounding her admittedly minor physical injury to her knee when the force of the explosion in the basement forced her off the sofa and onto the floor is itself quite traumatic, we cannot conclude that the jury had no basis for finding the emotional injury associated with her own experience of, and physical injuries from, the explosion – quite apart from the emotional trauma of seeing the injuries sustained by her husband – are grossly excessive. Accordingly, as to the jury’s damage award for Mrs. Bitler’s negligence claim, we affirm.

## VII

For the reasons set forth above, we **AFFIRM**.