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**ESTATE OF CLAISSON L. GROFF, MARY L. GROFF, et al., Plaintiffs, vs.
AQUILA, INC. and GOODMAN COMPANY, L.P., Defendants.**

No. 4:05-cv-0250-JAJ

**UNITED STATES DISTRICT COURT FOR THE SOUTHERN DISTRICT OF
IOWA, CENTRAL DIVISION**

2007 U.S. Dist. LEXIS 98729

**September 28, 2007, Decided
September 28, 2007, Filed**

COUNSEL: [*1] For Estate of Claison L. Groff, Kim Bengston, Mark A Boehm, Mary Katherine Boehm, Alexa Groff, Bryn Groff, Kace Groff, Kristopher J Groff, Mary L Groff, Quinn Groff, Teresa L Groff, Chelsea Heim, Holly Heim, Kellie Heim, Plaintiffs: Donald G Beattie, LEAD ATTORNEY, BEATTIE LAW FIRM PC, DES MOINES, IA; Robert Allen Burnett, Jr, LEAD ATTORNEY, Law Office of Robert A. Burnett, Jr., Des Moines, IA.

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JUDGES: JOHN A. JARVEY, UNITED STATES DISTRICT JUDGE.

OPINION BY: JOHN A. JARVEY

OPINION

ORDER

This matter comes before the court pursuant to defendant Aquila's January 5, 2007, motion for summary judgment and its January 5, 2007, motions to exclude the expert [*2] testimony of plaintiffs' experts Dr. William S. Cain, Dr. Jerry L. Hall, and Mr. W. Alan Bullerdiak (docket nos. 55, 57, 59, 61).

I. Statement of Material Facts

1 Where disputed, the facts are set forth in the light most favorable to the plaintiffs as the nonmoving party.

This matter evolves out of a fire that occurred at the home of Claison (Clay) and Mary Groff in Boxholm, Iowa, in the early morning of December 25, 2003. The Groffs lived in a two-story home heated by an Amana furnace in its basement. The furnace ran on natural gas, which the defendant Aquila supplied, and was the only gas appliance in the house.

According to Mary's testimony, Clay and Mary were hosting a Christmas gathering for both in and out-of-town friends and family members on the night of December 24, 2003. That evening, the Groffs had 22 people at their home. As a result, Mary claims that, at approximately 7:00 pm, she turned the thermostat setting on their furnace down from 70 degrees to 60 degrees. When roughly half the people left later that evening, Mary claims that she, Clay, and the ten remaining out-of-town friends and family members went to bed without returning the thermostat to its previous setting.

At [*3] approximately 1:30 am on December 25, Mary claims that she awoke, found it was cold in the house, and went to the thermostat to turn on the furnace. According to Mary, she turned the thermostat setting from 60 to 65 degrees but did not hear the usual sound of the furnace igniting. She turned the setting higher so the furnace would ignite. She was not successful. After allegedly setting the thermostat to 80 degrees and not hearing the furnace ignite, Mary states that she awoke her husband Clay to tell him of the problem. Clay went downstairs to the furnace and returned to the main floor of the home to recheck the thermostat. She then states that Clay returned to the basement a second time to check the furnace's circuit breaker. While Clay was in the basement this second time, Mary finally heard the furnace ignite. According to Mary, Clay returned to the main floor, told Mary she could go back to bed, and walked back down the hallway toward the thermostat. At that point, Mary heard a "WHOOSH" and turned to see ribbons of fire and black smoke coming out of a cold air return in the living room. A large fire quickly broke out and despite the efforts of three local fire departments, it destroyed [*4] much of the Groffs' home. Clay was unable to escape the house and died in the blaze. All the other family members escaped and were treated for injuries.

Special Agent Dana Wipperman, a fire inspector with the State of Iowa Department of Public Safety, began an immediate investigation of the fire on the morning of December 25, 2003. That day he interviewed witnesses and made preliminary findings at the scene of the fire. He returned to the scene on December 26 to continue his investigation. After Wipperman left that day, Aquila removed the Groff residence's exterior gas meter and regulator without Wipperman's knowledge. According to the record, those items stayed in Aquila's possession and were not tested until February 3, 2004.

On February 3, 2004, Wipperman met insurance, appliance, and equipment representatives to perform leak tests on the Groffs' gas system. Among those present for the tests was Dr. Jerry Hall, one of the plaintiffs' experts in this case. Representatives from Aquila reconnected the Groffs' gas meter and regulator to the house. The parties then performed tests to determine whether a gas leak existed between the meter and regulator and the Groffs' furnace. Wipperman's [*5] report states that these tests did not reveal any leaks. Both parties have essentially ruled out a leak from this area of the gas system as the cause of the fire. Following this test, the plaintiffs removed the furnace from the site and shipped it to Dallas, Texas, for storage pending further investigation. On February 24, the parties returned to perform leak tests on the natural gas piping system that led to the Groffs' residence. All parties agree that this testing revealed that the pipes to the Groffs' house did not leak.

On June 2, 2004, Wipperman filed a Field Investigation Report containing his findings. According to the report, which considered Wipperman's observations, his witness interviews, and the leak test results, Wipperman concluded that the fire was most likely an accidental fire caused by the furnace's ignition of leaking and accumulating gas in the cold air return. He could not, however, conclusively determine the source or identity of the gas. Wipperman noted that, in addition to the furnace as a potential source for gas, there were out of service septic tanks and sewer lines near the Groff house.

The plaintiffs resumed their investigation of the origin of the fire. [*6] In February 2005, the plaintiffs had the

furnace shipped to Dr. Hall in Ames, Iowa, for further testing. Dr. Hall stored the furnace in an unopened crate in his office until June 10, 2005, when representatives and experts for both the plaintiffs and defendants came together to test the furnace for potential leaks using agreed upon protocols. Their testing revealed a small overall leak in the furnace, but the parties were unable to pinpoint the exact origin of the leak while they were together. After the parties left, however, Dr. Hall remained with the furnace and continued testing different parts. That same day, Dr. Hall successfully located and photographed a leak originating in the furnace's control valve. Based on these tests and the above information, Dr. Hall authored a report that proffered multiple theories that he believes explain why a natural gas leak from the furnace control valve caused the fire at the Groff home.

II. Procedural History

On April 6, 2005, the injured Groff family members and Claison Groff's estate filed suit in the Iowa District Court in and for Boone County against defendants Aquila, Inc., Goodman Co., and White-Rodgers, a Division of Emerson Electric Co., [*7] for damages relating to the fire. All three defendants provided products and services related to the Groffs' gas furnace.² The plaintiffs' complaint alleges counts of negligence, breach of warranty, manufacturing defects, design defects, and inadequate warnings.

² Specifically, Aquila supplied the furnace with natural gas; Amana, later owned by Goodman, manufactured the furnace; and White-Rodgers manufactured the gas-valve on the furnace.

On May 2, 2005, the three defendants filed a joint motion under *28 U.S.C. § 1441* to remove the case from the Iowa District Court in and for Boone County to the United District Court for the Southern District of Iowa (docket no. 1). Removal was proper as this court possesses original and supplemental jurisdiction over the entirety of the plaintiffs' claims.³ See *28 U.S.C.A. §§ 1332, 1367 (2007)* (defining diversity and supplemental jurisdiction).

³ It is undisputed that, at the time of the state court filing, (1) each plaintiff was an Iowa resident; (2) Aquila was a Delaware corporation with its principal place of business in Missouri; (3) Goodman was a Texas formed limited partnership with its principal place of business in Texas; (4) White-Rodgers was [*8] a Missouri Corporation with its principal place of business in Missouri; (5) at least one plaintiff sought in excess of \$ 75,000 in damages; and (6) all other claims in question were "so related to claims in the action within such original jurisdiction that they form part of the same case or controversy under Article III of the United States Constitution." quoting *28 U.S.C.A. § 1367 (2007)*. Thus, the requirements of subject matter jurisdiction are met under *28 U.S.C. §§ 1332 and 1367*.

On August 5, 2005, the plaintiffs and White-Rodgers stipulated to the dismissal of White-Rodgers from this suit (docket no. 16). The claims against White-Rodgers were dismissed without prejudice (docket no. 17).

On January 5, 2007, Aquila filed a motion for summary judgment and motions to exclude the expert testimony of Dr. William S. Cain, Dr. Jerry L. Hall, and Mr. W. Alan Bullerdiek (docket nos. 55, 57, 59, 61). On January 5, 2007, Goodman filed a separate motion to exclude the expert testimony of Hall and Bullerdiek (docket no. 63). On February 14, 2007, the plaintiffs filed a response to Aquila's motion for summary judgment (docket no. 71). On February 15, 2007, the plaintiffs filed responses to Aquila's [*9] motions to exclude the expert testimony of Hall and Bullerdiek and Goodman's motion to exclude the expert testimony of Hall and Bullerdiek (docket nos. 72, 73, 74). On March 2, 2007, Aquila filed a reply to plaintiffs' response to its motion for summary judgment (docket no. 75).

In March 2007, Goodman settled with the plaintiffs and the court dismissed it from the case. On April 11, 2007, the court held an oral hearing on Aquila's remaining pending motions.

III. Motions to Exclude Expert Testimony

A. Applicable Law

Federal Rule of Evidence 702 governs the admissibility of expert testimony. *Lauzon v. Senco Prods., Inc.*, 270 F.3d 681, 686 (8th Cir. 2001). That rule states:

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

Accordingly, [*10] admissible expert testimony must be: 1) "based on scientific, technical, or other specialized knowledge [that is] useful to the finder of fact in deciding the ultimate issue of fact," 2) presented by a qualified witness, and 3) "reliable or trustworthy in an evidentiary sense." *Lauzon*, 270 F.3d at 686 (quoting and citing 4 Jack B. Weinstein & Margaret A. Berger, *Weinstein's Federal Evidence* § 702.02[3] (2001); *Daubert v. Merrell Dow Pharms., Inc.*, 509 U.S. 579, 591, 113 S. Ct. 2786, 125 L. Ed. 2d 469 (1993)).

Congress amended *Rule 702* in 2000 to more accurately reflect the United States Supreme Court's holdings in *Daubert v. Merrell Dow Pharms., Inc.*, 509 U.S. 579, 591, 113 S. Ct. 2786, 125 L. Ed. 2d 469 (1993), and its progeny. See Weinstein & Berger, *supra*, at 702 App. 02[1]. In *Daubert*, the Supreme Court charged federal district court judges with the responsibility to act as "gatekeeper[s]" for the admissibility of expert testimony." *Lauzon*, 270 F.3d at 687. In performing this gatekeeper function, a district court has broad discretion to admit or reject the admissibility of expert testimony. *Peitzmeier v. Hennessy Indus., Inc.*, 97 F.3d 293, 296, *Freem. Ch. 1020* (8th Cir. 1996). *Federal Rule of Evidence 104(a)* governs the method by which a court makes an admissibility [*11] decision for expert testimony. *FED. R. EVID. 104(a)*. Under *Rule 104(a)*, the proponents of the disputed testimony must prove admissibility by a preponderance of the evidence and the court, in making its decision, "is not bound by the rules of evidence except those with respect to privileges." *Id.*; *Bourjaily v. U.S.*, 483 U.S. 171, 175, 107 S. Ct. 2775, 97 L. Ed. 2d 144 (1987). Generally speaking, *Rule 702* is a rule of "admissibility rather than exclusion" that represents the "liberal thrust" of the Federal Rules and their 'general approach of relaxing the traditional barriers to 'opinion' testimony;" however, even under this standard, evidence must still be more than "subjective belief or unsupported speculation" to be admissible. *Daubert*, 509 U.S. at 588, 590 (citations omitted); *Arcoren v. United States*, 929 F.2d 1235, 1239 (8th Cir. 1991). *Daubert*, 509 U.S. at 590.

Under *Rule 702*, admissible evidence must be both relevant and reliable. *Daubert*, 509 U.S. at 589. *Federal Rule of Evidence 401* defines relevant evidence as "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." *Rule 702* [*12] incorporates this definition by requiring that admissible expert testimony "assist the trier of fact to understand the evidence or to determine a fact in issue." *FED. R. EVID. 702*; *Daubert*, 509 U.S. at 591. The Supreme Court has characterized the relevance requirement as a matter of "fit" and has stated that evidence fits a case when it relates to the issue at hand or has "a valid scientific connection to the pertinent inquiry." *Daubert*, 509 U.S. at 591-92.

Rule 702 directly addresses *Daubert's* reliability requirements with its final three qualifications,⁴ which were added in 2000. *Lauzon*, 270 F.3d at 686. To determine the reliability of expert testimony, *Daubert* and its progeny have set forth a non-exclusive, non-dispositive checklist for trial courts to consider. *Kumho Tire Co. v. Carmichael*, 526 U.S. 137, 150-51, 119 S. Ct. 1167, 143 L. Ed. 2d 238 (1999); *Lauzon*, 270 F.3d at 686-87 & n.2. This list includes factors such as: 1) whether the theory can and has been tested, 2) whether the theory has been published and subjected to peer review, 3) the rate of error, 4) the theory's general acceptance in the scientific community, 5) whether the expert developed knowledge for the testimony independently or for purposes of [*13] litigation, 6) whether the expert accounts for alternative explanations, and 7) whether the expert connects his or her testimony with the facts of the case. *Id.* (citations omitted).

⁴ These final three requirements are "(1) the testimony is based upon sufficient facts or data, (2) the testimony is the product of reliable principles and methods, and (3) the witness has applied the principles and methods

reliably to the facts of the case." *FED. R. EVID.* 702.

B. Dr. Hall's Expert Testimony

The plaintiffs retained Dr. Hall to evaluate the evidence and determine, in his expert opinion, what caused the Groff fire. On July 19, 2005, Dr. Hall submitted a report concluding that the most probable cause of the fire was an accumulation of natural gas that ignited when Clay Groff restarted the furnace on the morning of December 25, 2003. The report then puts forth multiple theories attempting to explain how such a dangerous amount of natural gas could have leaked from the furnace and accumulated in the Groff house without anyone's knowledge. Aquila argues that each of Dr. Hall's theories and conclusions are unreliable and that the court should exclude them under Daubert.

1. Leak Theories

A review of [*14] Dr. Hall's report and deposition reveals that he puts forth three primary theories that attempt to explain how gas could have leaked from the Groffs' furnace and caused the fire on the night in question.

Dr. Hall's first theory, which is the primary theory set forth in his report, is a "steady-leak" theory. This theory asserts that if gas consistently leaked from the furnace at the rate measured on June 10, 2005, then enough gas could have accumulated in the Groff house over a period of time to cause the fire in question. Specifically, Dr. Hall asserts in his report that if gas leaked from the furnace at a rate of 0.05 feet per hour, which is roughly what he believes the parties measured the leak to be during testing, then, over a five-to-ten hour time period, enough combustible gas could have accumulated to ignite and cause the fireball that Mary witnessed on the morning of the fire.

Dr. Hall's second accumulation theory, which he more strongly asserts in his deposition, is a "larger-leak" theory. This theory asserts that the furnace leak was bigger on the night of the fire than it was when the parties measured it on June 10, 2005. Dr. Hall's report vaguely alludes to this theory when [*15] it notes that the parties tested the furnace a year and a half after the furnace traveled from Iowa to Texas and back. In his deposition, Dr. Hall asserts that this fact is significant because such a combination of time and travel, which may have included significant movement and jostling of the furnace, might have varied the test results by tightening or closing leaks that may have been present on December 25, 2003.

Dr. Hall's third accumulation theory, which he also more strongly asserts in his deposition, is an overpressurization theory. This theory asserts that there may have been an intermittent furnace control failure on the night of the fire that allowed overpressurized gas to enter the furnace, force open the control valve, and leak into the Groff house. Specifically, Dr. Hall claims that such a failure could have been caused by a blockage of the regulator valve and vent. He asserts that such a blockage could have been caused by the valve freezing open and the vent freezing shut or by a foreign object forcing the valve open while another object blocked the vent.

Aquila contests each of Dr. Hall's leak theories and seeks to exclude them as unreliable evidence. Specifically, it [*16] claims that Dr. Hall's conclusions are unreliable because they are not based on sufficient facts and data. First, it argues that Dr. Hall's individual June 10 test results that revealed the origin of a leak are unreliable and should not be considered because Dr. Hall found the leak after the other parties left his office. Aquila argues that such testing violated an implicit agreement to test the furnace only in everyone's presence. Second, Aquila argues that Dr. Hall's steady-leak theory is unreliable because it claims that Dr. Hall used an inaccurate measurement of the leak found on June 10 to make his accumulation calculations. Specifically, Aquila contends that the leak found on June 10 was smaller than 0.05 feet per hour and that Dr. Hall could not use that number to accurately calculate accumulation and support his theory. Third, Aquila argues that Dr. Hall's gas-accumulation calculations for his steady-leak theory are unreliable because he failed to consider the effect of the house's air exchange rate on the gas accumulation.⁵ Aquila asserts that, in an average house, old air exchanges with new air up to three times an hour. Thus, it argues that some, if not all the gas that [*17] the furnace possibly leaked probably escaped the house before accumulating. Therefore, it argues that Dr. Hall could not reach an accurate accumulation calculation without considering the effects of air exchange. For these reasons, it

assert that Dr. Hall's steady-leak theory is unreliable.

5 Air exchange refers to the process by which fresh outdoor air exchanges with old, "stale" air in a house.

Aquila also challenges the reliability of Dr. Hall's larger-leak theory. It asserts that this theory is unreliable because it is speculative and not supported by any objective evidence. It claims the only leak that the parties have reliably found is the small leak that testing revealed on June 10, 2005. Any notion that a larger leak existed on the night of the fire, they argue, is mere speculation. They further argue that Dr. Hall's theories as to how time or travel could have shrunk the leak are also speculation. They claim there is no objective evidence supporting this theory and that it is only an attempt by Dr. Hall to explain away shortcomings of his steady-leak and odor-failure theories.

For similar reasons, Aquila also challenges Dr. Hall's overpressurization theory. It asserts again that [*18] such a theory is unreliable because no testing has revealed any failure of the regulator or control valve to depressurize incoming gas. It also argues that no objective evidence exists indicating that anything blocked the regulator. Finally, Aquila claims that Dr. Hall's overpressurization theory is unreliable because he has not recreated such an event or subjected the furnace control valve to testing that indicates whether overpressurized gas would actually force it open. Thus, they claim again that there is no objective evidence supporting this theory and that it is only an attempt by Dr. Hall to explain away shortcomings of his steady-leak and odor-failure theories.

The plaintiffs argue that Dr. Hall's testimony is admissible because it is reliable and supported by sufficient facts and data. Plaintiffs argue that Dr. Hall's overall conclusion that the furnace leaked the fire-causing gas is a reliable conclusion that is supported by the evidence. They assert that there is support for this conclusion because Agent Wipperman determined that the ignition of gas caused the fire, the furnace was the only gas appliance in the house, and the June 10 testing revealed the presence of a furnace [*19] leak. They also assert that there is support for Dr. Hall's conclusion because the parties eliminated all other potential gas leaks by testing the rest of the Groff's gas system on February 3 and 24. Based on this evidence, the plaintiffs claim all of Dr. Hall's testimony is reliable because they claim sufficient facts and data support his overall conclusion. Under Daubert, they assert that an expert does not need to narrow his or her decision further "to categorically exclude each and every possible cause . . ." *Bitler v. A.O. Smith, 400 F.3d 1227, 1237 (10th Cir. 2004)*. The plaintiffs argue that "to require otherwise would mean that few experts would be able to testify." *Id.* Nevertheless, even if the court will not let Hall testify to all his theories based on the sufficiency of his overall conclusion, the plaintiffs claim that Dr. Hall's accumulation theories are independently reliable and admissible.

As to the steady-leak theory, the plaintiffs assert that Aquila's attacks on Dr. Hall's individual testing and measurements are unfounded. The plaintiffs argue that Dr. Hall did not violate any protocol in continuing his testing on June 10, 2005. Instead, they claim that Dr. Hall [*20] only finished the testing to find the leak that other parties recognized, but did not work hard enough to identify. They claim that Dr. Hall's tests are reliable because Dr. Hall photographed his results and used the same scientifically valid methods to find the leak that the parties agreed to in their protocol. They further claim that Dr. Hall's findings remain testable and that Aquila can verify his findings. The plaintiffs also argue that Dr. Hall did not err in using 0.05 to make his accumulation calculations because the measurement was close to 0.05 on the measurement device, which was the lowest measurement mark on it. They claim that because the lowest measurement mark on the measurement device was 0.05, Dr. Hall made his calculations based on the best available measurement he observed. They also argue that Dr. Hall reaffirmed this number by timing the leak relative to the pressure gauge, which is another method of testing leaks. Therefore, they claim that Dr. Hall's accumulation calculations are reliable. Regardless of these arguments, the plaintiffs also assert that Aquila's attacks as to Dr. Hall's individual testing and measurement observations present issues of fact and [*21] credibility that the court should not determine under Daubert. These issues, they claim, are more appropriate for a jury to decide and for Aquila to challenge on cross-examination or with contradictory evidence.

The plaintiffs also assert multiple arguments that they claim explain why air exchange rates were irrelevant and would not have changed Dr. Hall's calculations of gas accumulation. First, they claim that Aquila incorrectly assumes

that the air exchange theory means that all the air in a house is consistently exchanged. Instead, the plaintiffs assert that, in reality, air exchange is heavily limited to fresh air on the outer areas of the house while "stale" air in the middle of the house is unaffected. Second, the plaintiffs claim that the air exchange rate of an older house like the Groffs' would be small because they claim old houses are tighter and less prone to air exchange than new homes. Third, the plaintiffs argue that air exchange is irrelevant if the gas accumulated in the cold air ducts of the house. In such a situation, they claim the gas would have been trapped in the ducts and unaffected by any potential air exchange in the house. Fourth, the plaintiffs argue that [*22] the defendants' contention that air exchanges up to three times an hour is simply incorrect and not supported by relevant data. They claim and have submitted data from the Environmental Protection Agency that state that the recommended air exchange rate in a home is 0.35 air exchanges per hour. Finally, the plaintiffs claim that the air exchange rate for the Groff house would have been impossible to consider in calculations because the fire destroyed the house and rendered it untestable. For these reasons, they assert that Dr. Hall's testimony regarding his steady-leak theory and gas accumulation calculations are admissible.

The plaintiffs also argue that Dr. Hall's larger-leak theory is supported by evidence. First, they claim that there is direct evidence supporting this theory because the parties found a leak in the furnace on June 10. Second, they claim that the circumstantial evidence of the fire ball and nature of the fire support a theory that the leak was bigger on the night in question. Third, they assert that the control valve that leaked was spring loaded, such that the jostling from shipping could have closed any potential leak that existed on the night of the fire. Finally, [*23] they assert that Dr. Hall supports this larger leak theory through the process of differential diagnosis. Thus, they claim that Dr. Hall's testimony regarding this theory is admissible.

The plaintiffs make similar arguments to support the reliability of Dr. Hall's overpressurization theory. They again point to the nature of the fire as evidence that more gas might have leaked on the night of the fire. They also state that common sense and the laws of physics support the conclusion that an overpressurization would have led to a larger leak. They claim that overpressurization events are well documented and that the control valve has a rating that indicates it would not withstand the force of overpressurized gas. Finally, they assert again Dr. Hall's conclusion is reliable because he used a valid method of differential diagnosis to support his theory. For these reasons, they assert that Dr. Hall's testimony as to this theory is admissible.

2. Odor Failure Theories

In addition to Dr. Hall's theories that attempt to explain how the furnace may have leaked and caused the fire, Dr. Hall also attempts to explain in his report and deposition how an accumulation of gas could have escaped the Groffs' [*24] knowledge.

It is undisputed that natural gas is an odorless, deadly gas. Thus, suppliers like Aquila mix it with an odorant to alert people of its presence. In this case, the parties agree that Aquila typically mixes its natural gas with at least an odorant called Tertiary Butyl Mercaptan (TBM).⁶ The parties also agree that no one present in the Groff house on the night of December 24 or the morning of December 25 smelled an odorant that indicated the presence of a natural gas leak. Nevertheless, Dr. Hall presents multiple theories in his report that attempt to explain how an accumulation of natural gas mixed with an odorant like TBM could have gone unnoticed in the Groff house.

⁶ Aquila, however, states that in addition to TBM, it also adds Ethyl Methyl Sulfide ("EMS") to the gas it supplies.

The first possible theory Dr. Hall asserts to explain the Groffs' failure to notice a gas leak is TBM's alleged oxidation, absorption, and adsorption tendencies. Dr. Hall asserts that these properties cause the odor of TBM to fade and that, in such an event, the Groffs would not have smelled an accumulation of natural gas mixed with TBM. Second, Dr. Hall claims that a certain percentage of the population [*25] simply cannot detect the odor of TBM. Thus, he asserts that people simply may not have smelled the possible presence of natural gas. Third, Dr. Hall argues that TBM may have been masked by other odors that were potentially present in the house. Fourth, Dr. Hall asserts that physical

conditions like common colds interfere with people's abilities to smell any odorants like TBM. Fifth, Dr. Hall claims that odorants like TBM will not awaken a sleeping person. Thus, if there was a large leak that occurred while people were sleeping, Dr. Hall asserts that no one would smell it. Sixth, Dr. Hall claims that the gas may have been in an area, like a cold air duct, where people's noses could not adequately detect the smell. Seventh, Dr. Hall argues that the failure of people to smell TBM may indicate that the mixture was not sufficient to alert the plaintiffs of the gas's presence. Based on any or all of these theories, Dr. Hall believes that an accumulation of natural gas escaped the plaintiffs' knowledge.

Aquila contests each of these theories as potential explanations for the Groffs' failure to smell the presence of a natural gas accumulation. First, it asserts that there were at least 12, [*26] and up to 24 different people present during the events in question that could have and did not smell the presence of natural gas. Thus, it argues that it is highly unlikely that all the people in the house were immune to the smell of the odorant or were unable to smell it due to their physical conditions. Second, Aquila argues that Dr. Hall's theories that other odors masked the smell of TBM or that oxidation, absorption, or adsorption took place is mere speculation that is not supported by objective evidence. Third, Aquila argues that the odor fade deficiencies that Dr. Hall refers to in his report are linked to the odorant Ethyl Mercaptan, which is mixed in propane, and not TBM or EMS, which it mixes in its natural gas. Aquila asserts that Dr. Hall cannot point to any objective evidence or scientific studies that specifically refer to the qualities or limitations of either TBM or EMS. Finally, Aquila argues that Dr. Hall does not provide any factual support for the proposition that the gas was in an area where the Groffs could not have detected it. It claims that Dr. Hall failed to show any testing or propose a migration map of how the gas traveled from the furnace to an area where [*27] it accumulated without the plaintiffs' knowledge. For these reasons, it asserts that Dr. Hall's theories are unreliable and inadmissible.

The plaintiffs argue that Aquila's assertions are unfounded. They assert that Dr. Hall's testimony regarding the limits of TBM is reliable because it is based on sufficient scientific foundation. They argue that the scientific community has long recognized and documented the limits of all mercaptans, not just those in propane. Thus, they claim that Dr. Hall's theories of odor fade are generally accepted. They also submit a warning from Natural Gas Odorizing, Inc., a supplier of odorants to Aquila, that states NGO's odorants are not one-hundred percent effective for an extensive list of reasons, most of which Dr. Hall named in his report as possibilities for reasons why the Groffs may not have smelled a potential leak. For these reasons, the plaintiffs claim that Dr. Hall's testimony is reliable.

3. Analysis

The evidence set forth above strongly supports the plaintiffs' theory that the fire in the Groff residence was a natural gas fire. The fact that Mrs. Groff was attempting to turn up the furnace immediately before the explosion, that the furnace was [*28] the only natural gas appliance in the home and that there was a leak in that system all point to the furnace as the source of the fire. The size of the leak that was discovered remains problematic for plaintiffs' expert for all of the obvious reasons set forth above.

Pursuant to *Daubert*, the plaintiffs cannot start with the premise of a large natural gas fire and then adopt hypothetical causation scenarios that have no factual support. Dr. Hall can certainly testify to the origin and rate of the natural gas leak that he discovered on June 10, 2005. The fact that the parties agreed to and implemented a protocol for joint testing that did not reveal the source of the leak is an appropriate subject for cross examination but not grounds to exclude Dr. Hall's findings. Dr. Hall can also testify to the amount of gas accumulation required to cause a fire of the magnitude described by Mary Groff. Dr. Hall can further testify about the mechanics of a furnace and the mechanism for delivery of natural gas to that appliance. He can describe in detail the results of tests that were conducted to determine alternative sources of leaks. Dr. Hall cannot testify about how much natural gas actually accumulated [*29] on the night of the fire. The air exchange factor is an obviously important factor in determining natural gas accumulation. Dr. Hall's theory regarding the air exchange rate for the Groff house is complete speculation. Similarly, Dr. Hall will not be permitted to present a theory that there must have been a larger leak and that the hole from which the gas escaped could have or must have closed during shipment of the furnace. There is absolutely no support for this opinion. It simply fits Dr. Hall's speculation as to how a big fire could have occurred.

Similarly, Dr. Hall will not be permitted to speculate that a foreign object in the line forced open the control valve or that the spring loaded control valve was likely open immediately prior to the fire but was somehow jostled shut later in transportation. Again, there is simply no support for this opinion other than to say that a big fire occurred and that such a scenario could cause a big gas leak. No physical evidence, testing, literature or other acceptable method supports these theories.

The court cannot find anything in Dr. Hall's education, training or experience that permits him to testify about odor fade associated with TBM. [*30] His awareness of a warning from Natural Gas Odorizing, Inc. ("NGO") does not give him sufficient expertise to testify about the oxidation and absorption properties of TBM. In his deposition, he attempted to go much further and testify about a masking of such odors, the possibility of being desensitized to them and the ability of sleeping persons to detect such odors. Again, the court finds nothing in Dr. Hall's education, training or experience that permits him to opine on these matters. It is clear that he has done no significant research or testing with respect to any of these odorant theories. Again, the function of expert testimony is to explain how something happened, not to speculate as to how something could possibly have happened.

It is not enough in this Circuit for Dr. Hall to assume that the leak was larger at the time of the fire simply because he subjectively believes "there had to be more gas in the home . . . for the fire to occur the way it did." (Hall Dep. 152). Daubert's admissibility standard requires Dr. Hall to do more than support his position with an educated guess based on general principles; he needs objective evidence to support his theories. The Eighth Circuit [*31] recently confirmed this when it stated, "[w]here 'opinion evidence . . . is connected to existing data only by the ipse dixit of the expert,' a district court 'may conclude that there is simply too great an analytical gap between the data and the opinion proffered.'" *Pro Service Auto., L.L.C. v. Lenan Corp.*, 469 F.3d 1210 (8th Cir. 2006) (affirming a trial court's decision to exclude expert testimony from W. Alan Bullerdiel when he did not test his theories, but "offered only vague theorizing based upon general principles") (citations omitted). In this case, the plaintiffs and Dr. Hall attempt to bridge the gap from the fact that they found a small leak in the furnace to the fact that a large fire occurred by proffering the opinion that the leak therefore must have been bigger during the fire. No objective evidence presented supports this theory. The only objective evidence is the June 10 test, which revealed a leak at roughly 0.05 cubic feet per hour. This test did not reveal a bigger leak or a control valve malfunction that indicated an overpressurization event. Without such evidence, Dr. Hall simply attempts to bridge the gap to a larger leak with speculations and beliefs, not evidence.

C. [*32] Alan Bullerdiel's Testimony

Alan Bullerdiel is an expert witness retained by the plaintiffs on October 11, 2004. He describes himself as a graduate chemical engineer with experience involving codes, standards, custom and practice, hazard analysis, and accident investigation involving gas utilization equipment and supply systems. He worked as a field engineer for Northern Illinois Gas Company from 1959 to 1962 and later authored studies for the United States Consumer Products Safety Commission involving gas fired equipment and field supply systems. He headed the appliance testing laboratory at Calspan Corporation between 1974 and 1977. Since 1990, he has worked for Bullerdiel Associates providing consulting services. He has authored papers on safety standards for delivery of natural gas to residential appliances. He has testified as an expert in these areas many times.

His opinions are contained in a report dated July 13, 2006, and were the subject of a lengthy deposition. Among other things, he opines that the fire was the result of the ignition of fugitive natural gas which had accumulated in parts of the midsection of the Groff residence. He believes that the gas originated from the [*33] furnace and that the leak was "intermittent and dynamic, rather than static." He contends that there must have been gas overpressurization to the furnace because the furnace contained features that would not "catastrophically destruct" at ordinary gas pressures. He could not determine the source of ignition for the fire but identified an electrical source as a strong possibility. He has numerous additional theories about warnings that should have been provided by the manufacturer concerning odor fade, and gas detectors. He contends that Aquila should have provided warnings to ensure the installation of natural gas detectors and opines that Aquila failed to meet the odorization detection standard of providing an odor warning to the Groff family of the natural gas leak.

The overpressurization theory begins outside the home at the natural gas regulator. Mr. Bullerdiek believes that a valve within that regulator became blocked in the open position through corrosion, a small leak or dirt. He contends that the removal of the regulator by Aquila on December 26, 2003, prevented him from determining whether any of those foreign objects were present.

There is a second mechanism to prevent overpressurization [*34] from entering a residence. This is an internal relief vent in the regulator that allows gas to escape into the atmosphere outside the residence when overpressurization occurs. Mr. Bullerdiek opines that the vent was partially or fully obstructed by precipitation. Finally, the furnace itself had a control valve that further reduces the pressure of natural gas as it travels to the burners. Mr. Bullerdiek opines that the overpressurization caused the furnace control valve to be unable to close. As a result of the simultaneous failure of these three mechanisms, gas was allowed to flow freely into the Groff residence.

Mr. Bullerdiek did not inspect the Groffs' residence or any of the components to the natural gas system or the furnace and its component valves. He conducted no tests and was not present when items were tested by others. He did not know the make or model of the regulator at the Groff residence. He does not support his theory about precipitation on the vent with any observations, testing or even climatological data. He was aware that the test dial on the meter was not spinning when the Ogden fire chief turned off the gas to fight the residential fire. The fire chief's observation [*35] of the test dial is the best evidence that gas was not entering the Groff residence after the fire began. His overpressurization theory has to at least consider this evidence.

There simply is no factual support for Mr. Bullerdiek's overpressurization theory. Again, it rests on Mary Groff's attempt to turn the heat up in the residence, a large fire and an inability to hypothesize another way in which gas entered the home. It is based on the failure of three separate mechanisms that Mr. Bullerdiek has not examined or tested. It is an interesting hypothesis as to how such an accident could have occurred. It is not grounded in facts that show how it actually occurred.

The plaintiffs call Dr. Hall and Mr. Bullerdiek's approach a differential diagnosis. They cite *Hickerson v. Pride Mobility Prods.*, 470 F.3d 1252 (8th Cir. 2006), in support of their contention that such a differential diagnosis is an acceptable way for a mechanical engineer to reach a conclusion.⁷ In *Hickerson*, a motorized wheelchair was blamed for a fire that caused the death of a woman at her residence. Using traditional techniques to determine the origin of the fire, plaintiff's expert was able to determine that the most [*36] likely point of origin of the fire was at the location where the motorized wheelchair was located. It was also determined that the wheelchair's battery cable had shorted to the metal of the chair. However, the expert was unable to determine whether the short was the cause of the fire or the result of it. The expert was able to exclude other appliances and wiring in the area as possible causes of the fire. In the end, the only possible source of ignition was the wheelchair and it was determined to be the most likely source of the fire. However, plaintiff's experts were unable to identify any defect in the motorized wheelchair.

7 The differential diagnosis has been consistently recognized as appropriate for medical professionals.

In *Hickerson*, the court found that the burn patterns, heat, fire and smoke damage identified a point of origin for the fire. After eliminating other possible sources of fire in that area, the expert properly concluded that the motorized wheelchair was the only possible source of the fire's ignition. Because Missouri law permits juries to infer causation and product defects based on circumstantial evidence under a theory akin to *res ipsa loquitur*, the case should [*37] have been permitted to go to the jury without need for expert testimony as to a precise defect in the motorized wheelchair.

The court finds the instant case similar to *Hickerson*. The plaintiffs have appropriately identified the fire as being of natural gas origin.⁸ The plaintiffs have also appropriately identified the furnace as the likely source of that gas, as there were no other natural gas appliances in the Groff residence. The furnace is further suspect because the pipes leading to the furnace were tested and no leaks were found in them and a leak was found by Dr. Hall in the furnace itself.

8 The defendants contend that an alternative source of natural gas could be an abandoned septic tank nearby. It

is another interesting theory in this case that also probably would not survive the same Daubert challenge the defendant brings here. That issue is for another day.

The plaintiffs in Hickerson did not need to go further than identifying the origin of the fire, because of their ability to rely on Missouri's *res ipsa loquitur* type causation theory. That is, the plaintiffs in Hickerson did not need to speculate that a short in the battery cable ignited the fire. They were entitled to simply [*38] show the motorized wheelchair as the mechanism that caused the fire and rely on the argument that fires in such devices ordinarily do not occur in the absence of a defect.

In this case, Mr. Bullerdiek and Dr. Hall not only identified the origin of the fire but also have opinions concerning the precise mechanism of defect. Because their theories are not supported by an examination of the physical evidence or the results of any testing, these opinions are too speculative to survive a Daubert analysis. This goes well beyond the kind of differential diagnosis permitted in Hickerson.

Mr. Bullerdiek is qualified to discuss the concept and rate of odor fade in TBM. He can further point out the deficiency in gas odorants that cause him to believe that manufacturers must also recommend and warn of the need for natural gas detectors. What he cannot do is testify that persons present in the Groff residence did not detect this odor because they either had been desensitized to it or because they, in particular, were not capable of detecting it while sleeping.

IV. Aquila, Inc.'s Motion for Summary Judgment

Among the numerous claims brought by the Groffs, plaintiffs have alleged that Aquila was negligent [*39] in failing to adequately and reasonably warn users to purchase and utilize gas detectors and Aquila failed to require customers to use them. Mary Groff was questioned at her deposition on April 18, 2006, about her knowledge of gas detectors. In the span of just a few questions, Ms. Groff testified that she both knew and did not know prior to the fire that natural gas detectors could be purchased. Later in the deposition, she was asked the questions again by her lawyer and she unequivocally stated that she did not know that such detectors could be purchased.

The defendant contends that this is analogous to the situation where a plaintiff attempts to create a factual dispute to survive summary judgment by submitting an affidavit that contradicts their earlier sworn deposition testimony.

One of two things happened. Either the plaintiff was truly confused by the questions as she stated or she was having a difficult time determining what answer was the "correct" answer for purposes of furthering her claim. Because of the ambiguity in her initial answers and the fact that all of this activity occurred in one deposition, the court cannot determine as a matter of law that the evidence unequivocally [*40] favors the defendant. The motion for summary judgment is denied.

Upon the foregoing,

IT IS ORDERED that

1. Aquila's January 5, 2007, Motion [dkt 57] to Exclude the Expert Testimony of Dr. William S. Cain is denied as moot.

2. Aquila's January 5, 2007, Motions [dkt 59, 61 & 63] to Exclude the Expert Testimony of Dr. Jerry Hall and Mr. W. Alan Bullerdiek are granted and denied to the extent set forth in the text above.

3. Aquila's Motion [dkt 55] for Summary Judgment is denied.

DATED this 28th day of September, 2007.

/s/ John A. Jarvey

JOHN A. JARVEY

UNITED STATES DISTRICT JUDGE

SOUTHERN DISTRICT OF IOWA