

A Landmark Legionella Lawsuit: A Case Study Highlighting The Legal, Mechanical And Microbiological Factors

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Abstract

The 2013 lawsuit that is the subject of this paper, is believed to be the first reported Legionnaire's disease case wherein a chemical water treater was alleged to owe a general duty to the public to protect it from Legionella related illness. This wrongful death lawsuit arose from a Legionella outbreak in the Summer of 2010. As a result of the exposures, five hotel patrons alleged that they contracted Legionnaire's disease from the hotel's cooling water system. It was alleged that two of the plaintiffs tragically died as a result and a third plaintiff was diagnosed with severe sepsis with respiratory failure and Legionella pneumonia.

In their lawsuit, Plaintiffs alleged that the chemical water treater providing routine treatment owed hotel patrons and by extension, the general public, a number of Legionella related duties including a duty to "timely and properly treat and service the cooling tower so as to prevent the formation of Legionella bacteria." In a landmark decision, the United States District Court for the Southern District of Mississippi dismissed the case in its entirety finding no evidence supporting a legal basis for imposing any Legionella-related duties on the chemical water treater. On June 22, 2017, United States Fifth Circuit Court of Appeals in New Orleans affirmed the dismissal.

The publication is part of a multi-part series which addresses the highly complex nature of the critical legal, mechanical and microbiological factors underlying this landmark decision.

Factual Background

The Hotel & Water Treatment

The hotel at the heart of this case was a locally owned, three-story, boutique hotel operated in a historic building in a compact downtown area of Starkville, Mississippi. The building had previously served as a hotel, but had been vacant for some time before the current owners purchased the property. During the renovations, the owner chose to keep the existing rooftop cooling tower and the maze of old piping that ran throughout the building and eventually into the basement where a dual pump arrangement was housed. The condition of the piping and equipment and what cleaning was undertaken before start-up of the system are unknown. The owner performed all of the maintenance and treatment of the cooling system himself.

At some point after the hotel opened, a commissioned water treatment professional made a cold-call on the hotel owner. The owner testified that he was willing to place an order with the professional because he was unsatisfied with his then-current water treatment



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supplier. According to the water treater, he recommended that the hotel purchase and use both an oxidizing and non-oxidizing biocide along with a corrosion inhibitor. Despite the recommendation of a dual-biocide program, the owner purchased only the inhibitor and non-oxidizing biocide. There was no documentation reflecting the refusal of the recommended treatment program. The owner testified that he did not recall the professional recommending an oxidizing biocide. The professional testified

that he clearly recalled offering the standard dual biocide program and, as a commissioned salesman, would not have selectively omitted a chemical from his offering.

Over the next several years, the water treater visited the hotel for approximately 30 minutes once a month. Although the water treater made additional recommendations for products and equipment over the years, the owner was reluctant to implement anything that increased his costs. There was never a written contract between the hotel and the water treatment company, and the only documentation of their relationship available at the time the suit was filed an incomplete collection of purchase orders, invoices and Field Service Reports.

2010 Legionella Outbreak

In June 2010, the Mississippi Department of Health was notified of one confirmed and one suspected case of Legionnaires' Disease in individuals who had been guests of the hotel days before becoming ill. Two additional confirmed cases in former hotel guests were reported the next month.

With the Centers for Disease Control and Prevention, the Mississippi Department of Health undertook an extensive investigation, eventually determining that the hotel's rooftop cooling tower system was the source of the infections. Given its location, only three floors elevated and adjacent to the hotel's outdoor public spaces, the guests were apparently exposed to the Legionella bacteria through drift from the infected cooling tower that floated down to the hotel courtyard. The State notified the hotel's owner of its findings and the need to close outdoor public spaces in the vicinity of the cooling tower while the tower was cleaned.

Failed Attempts at Remediation

Disinfecting the system proved difficult. Using a CDC-provided protocol, a second water treatment company was hired to clean and super-chlorinate the tower over a 48-hour period in late July 2010. To maintain the protocol's required 50 ppm chlorine level, technicians continuously monitored the levels, adding as much as 88 ppm of chlorine into the tower. Noting that the chlorine levels continued to fall throughout the cycle, the technicians expected that the tower contained extensive biofilm buildup. However, when the tower was

drained and opened for inspection, it was found to be very clean and well maintained. One technician described it as "spotless."

Knowing that the rapid reduction in chlorine levels indicated fouling somewhere within the system, one of the technicians, who was also a certified pipefitter, went in search of other, possible areas within the system that might harbor the bacteria. In the basement's mechanical room, he noted several sections of piping obstructed from passing view that had been end-capped. He advised the owner that until these non-circulating lengths of pipe were removed, they would continue to have problems. Accordingly, he recommended to the owner that these dead-legs be removed and the system disinfected a second time.

The hotel owner had the identified piping removed. Then, citing the inability to pay the water treatment company to perform an additional remediation, he and another of his employees undertook to clean the tower on two separate occasions. Subsequent testing proved each cleaning unsuccessful. By November, the State ordered the hotel to disable the cooling tower until a written remediation plan was submitted by a CDC-approved contractor.

The hotel engaged a public health professional to prepare and submit the required, revised remediation plan. Before the plan was implemented in February 2011, the expert advised the hotel to make additional repairs to the tower, such as replacing the spray nozzles and eliminating a side stream filter. After the fourth remediation attempt, the tower once again tested positive for Legionella bacteria within the six-month post-remediation testing period mandated by the CDC.

Citing the four failed remediation attempts, the State ordered the hotel to render the cooling tower permanently inoperable. In compliance, the hotel replaced the cooling tower in August 2011. Thereafter, the State was notified of yet another case of Legionnaires' Disease in a person who stayed at the hotel in September 2011 and traced the offending organism back to the cooling water system. The CDC reported that the evaluation of clinical samples from the new case confirmed that the legionella strain was the same as the 2010 outbreak strain. In addition to the latest incident of disease, another positive test for Legionella in the cooling water system was discovered in November 2011.

The Key Dead Leg

During this timeframe, the CDC, in consultation with the company who performed the first remediation and other chemical and engineering experts, undertook a sequential process of elimination with respect to possible causes of continued isolation of Legionella from the hotel's system. After considering that four remediations, changes to the system, and replacement of the cooling tower had not eliminated the problem, an epidemiologist with the Mississippi Department of Health concluded that Legionella bacteria was originating from an area "deeper in the system that would be in a protected area where it could periodically become released . . ." Based upon his first-hand observation of the system, the epidemiologist discovered that a dual pump arrangement in the plumbing system allowed another dead leg area to occur: "the primary findings of a visual inspection of the system layout is the unused pump circuit and the parallel arrangement acts as a dead leg or very near dead leg, thus serving as a potential source and hiding area for bacteria and build-up of biofilm." Because only one pump at a time was used (the other serving as a back-up), water in the unused pump's piping was stagnating in an area where it was hidden from water treatment chemicals.

In addition to being released when the pumps were alternated, the bacteria harboring in the dead leg could enter the circulating side of the system in other ways. For example, "pressure disturbanc-

es in the system, such as power on-off transitions, could result in some of the accumulated biofilm and bacteria being broken off and entering the circulating side and serve to reseed the tower." In addition, Legionella could enter the circulating part of the system from the dead leg through unpredictable migration at an unknown variable rate.

To fix the problem, "bypass lines were installed to keep water stagnation from occurring by allowing treated water to circulate through both sides of the system on a continual basis." Following the installation of the bypass line and an additional remediation, the system was again tested in May 2012. All results were negative. The modifications to the basement plumbing of the hotel (removal of the dead legs) was described by one witness as "the missing piece of the puzzle."

The Lawsuit

In May 2013, three of the former hotel guests who contracted Legionnaire's Disease filed suit in Mississippi for themselves and on behalf of their two deceased relatives.¹ The plaintiffs named as defendants the manufacturer of the hotel's cooling tower, the company that originally sold the tower, and the water treatment companies that supplied chemicals to the hotel both before and after the outbreak. Because the hotel was in bankruptcy, it was not named in the suit.

Early in the proceedings, the seller filed a Motion to Dismiss, which was granted by the court, citing Mississippi's innocent seller statute that protects sellers from suits claiming product defects.ⁱⁱ The tower manufacturer eventually settled with plaintiffs and was dismissed, and the plaintiffs agreed to dismiss the remediation company after discovering they had no involvement with the hotel before the outbreak.

The plaintiffs alleged that the sole remaining defendant, the chemical water treater, was liable for their Legionella-related injuries because it was purportedly negligent and grossly negligent in failing to prevent or control the Legionella in the hotel's cooling tower system and failing to protect the hotel guests by warning the hotel of the hazards of Legionella contamination and Legionnaires' Disease. The plaintiffs sought actual damages exceeding \$5 million in addition to punitive damages.

To prove their case, the plaintiffs engaged two experts to opine on the alleged negligence of the water treater. The first, the same public health professional who was unsuccessful in assisting the hotel in identifying the source of the Legionella contamination and remediating the system, offered an expert report and deposition testimony in which he opined that, among other things, the water treater breached its duties to warn the hotel of risks associated with Legionella in cooling towers and to provide a water treatment program to prevent the development of Legionella bacteria in the hotel's cooling water system or to control it below unknown and unspecified "infectious levels." It was also this expert's opinion that the municipal water supply was the source of the bacteria.

Plaintiffs' second expert, a Ph.D. microbiologist, testified that the water treater failed to follow treatment protocols set forth in guidelines published by various industry groups such as ASHRAE and AWT. The expert admitted that the guidelines were voluntary and only advisory, but testified that in his opinion, those "industry best practices" should establish the standard of care for control of Legionella through water treatment.

Critical Legionella Science

The state of Legionella science during the relevant time frame was critical in defending the water treater. Successful defense required

that the court be well educated regarding through citations to various scientific journals and industry, governmental and health organization publications. The following points proved particularly important to the outcome of this case.

Legionnaire's Disease is caused by the bacteria *Legionella pneumophila*.ⁱⁱⁱ *Legionella* is common and can be found in almost all ground and surface water.^{iv} It can also be found in potable water as it can survive most municipal chlorine treatments. Infected water poses a risk to people only when it is aspirated or inhaled in the form of a very fine mist.^{vi}

Legionella cannot be completely prevented.

"*Legionella* are ubiquitous in natural and artificial water environments worldwide and survive in a range of environmental conditions."^{vii} "Most cooling towers and evaporative condensers are likely to become contaminated with *Legionella* at some point in their serviceable life."^{viii} *Legionella* is routinely introduced into cooling water systems through "make-up" water (water needed to replace the water that evaporates) from municipal water supplies.^{ix} One of the experts proffered for the plaintiffs admitted that "[i]t is unrealistic to try to prevent the entry of the organism into the cooling tower or to create an environment that entirely precludes its growth and multiplication." *Legionella* can rapidly recolonize. It may be "non-detectable" in bulk water samples collected on one day, but can repopulate and be found within a few days.

While "the ultimate method of preventing human infections of legionellosis would be to completely eliminate or eradicate legionellae from the environment . . . this is impossible."^x Even procedures designed to prevent the dissemination of *Legionella* in cooling water systems will not guarantee that a system will be free of *Legionella*.^{xi} This is because "microbial control programs never sterilize cooling water systems. Even if enough chemical or other agent could be added to achieve sterilization, the system would rapidly become recolonized with microorganisms since cooling systems are open to the environment."^{xii} This is evidenced by "high . . . levels of *Legionella* [that] have been found in otherwise well-maintained and operated tower systems."^{xiii} In other words, even under the best circumstances in which a system is routinely cleaned and treated, *Legionella* may still exist and proliferate.

Most water treatment programs are not meant to control Legionella.

Water treatment is a part of the necessary routine maintenance to keep a cooling water system operating efficiently and to lengthen its useful life. Thus, it is widely accepted that "[m]ost water treatment programs are designed to minimize scale, corrosion and bio-fouling and not to control *Legionella*."^{xiv}

As a 30-year veteran chemist in the water treatment industry testified, *Legionella* has no impact on a cooling system's efficiency or longevity. *Legionella* is a parasite, which feeds upon biofilm.^{xv} Although *Legionella* may therefore be found in the biofilm, the bacteria, unlike the biofilm, does not affect the efficiency of the equipment by acting as an insulator, nor is it the kind of bacteria that secretes chemicals that can cause corrosion. Accordingly, water treatment for the purpose of eliminating *Legionella* is beyond the scope of a typical water treater's job, although treatment may have some indirect effect on *Legionella* levels as a result of reducing biofilm growth.

There is no standardized treatment protocol for Legionella control.

At all relevant times, neither the Federal nor State Government had enacted regulations regarding the sampling, treatment or prevention

of *Legionella* bacteria.^{xvi} Similarly, there were no Federal or State statutes or agency-required mandates governing the operation of systems with the potential to amplify *Legionella* bacteria.^{xvii} "Because *Legionella* infection is a rare and relatively unforeseeable occurrence, there is no clear set of prevention guidelines."

Plaintiffs' experts testified that no standard or regulation existed. In fact, in 2011, a year after the occurrence, one of Plaintiffs' liability experts, wrote about "the need for a legionellosis standard practice" as follows:

The prevention of Legionellosis in the U.S. is not very effective because there is no standardized specification for exactly what to do with all of the available hazard analysis and control information data about Legionella.

We need a standardized practice to specify for facility managers/owners exactly what must be done to control the hazard in a systematic, scientifically defensible way.

It was undisputed that no industry standard or regulation existed at the relevant time.

Dead legs impede chemical water treatment.

"Most engineered aquatic systems—especially those that are complex (e.g. those in health-care facilities and hotels)—have areas containing biofilms, even when the system is well maintained."^{xviii} Biofilms are most likely to form in areas of a man-made water system where there is low water flow or where the water is allowed to stagnate.^{xx} Such an area is commonly referred to as a "dead leg."^{xxi}

Dead legs are problematic because "[s]tagnation of the system or areas of stagnant water (e.g. dead legs) prevent proper chemical treatment of the system, and allow legionellae and their hosts to proliferate."^{xxii} Specifically, biofilm harboring inside a dead leg cannot be treated because water treatment chemicals can only reach the areas of the system where treated water can flow. Water treatment may be rendered irrelevant with respect to the contaminants in dead legs.

Given the environment in which *Legionella* thrives, most organizations strongly recommend the removal of dead legs from water systems because of their ability to foster the growth of *Legionella* in a water system. As the World Health Organization (The "WHO") has cautioned, "[d]eadlegs on existing systems should be removed or shortened (so that their length is no longer than the diameter of the pipe), or should be modified to permit the circulation of chemically treated water."^{xxiii} The presence of a dead leg can undermine a water treatment program, no matter how comprehensive because *Legionella* contamination can originate from small areas of a water system that are not exposed to temperature fluctuations or circulating disinfectant.^{xxiv}

The WHO illustrated this phenomena in its 2007 publication, "*Legionella and the Prevention of Legionellosis*" with an example from a large teaching hospital in the United Kingdom. There, legionellae were intermittently detected at one sentinel outlet, despite the fact that there was a comprehensive control regime in place. The source was eventually tracked down to a 10-centimetre length of water-filled pipe where there was little or no flow (a "dead leg"). When this section of pipe was removed, subsequent sampling remained negative.

In the courtroom, without an infectious dose level, Legionella control is a mere concept.

"[T]he mere presence of legionellae either in water or on a fixture or device will not in itself cause people who are present in the area to develop disease." *Legionella* concentrations in water systems cannot be correlated to quantitative determinations of Legionellosis risk. This is because the infectious dose for *Legionella* in humans is

unknown, as is the dose-response relationship for Legionella infections.^{xxxvi} It is undisputed "there is not enough information available to adopt a position on what is a 'safe' or 'unsafe' number of legionella or how long that number would be valid for an individual dynamic system."^{xxxvii} Thus, unlike other pathogens for which control levels may be established based upon known levels of bacteria at or below which no adverse health effects are expected to occur, no known control level exists for Legionella. There is simply no scientifically defensible "safe" or "unsafe" Legionella concentration.^{xxxviii}

Legionella levels have no direct correlation to Legionellosis risk.

Leading industry and health organizations have noted the lack of any correlation between the amount of Legionella present and the risk of Legionnaire's Disease. Indeed, "to date, no direct relationship has been established between the risk of infection and the number of Legionella detected in a water system using the generally adopted culture method."^{xxxix} "[T]he presence of the organism is not directly equated to the risk of infection and the organism has been found without being associated with cases of disease."^{xxx}

It has been observed in the literature that "[s]ome cases of legionellosis indicate that a low number of legionellae was sufficient to cause illness. In other analyses, a higher number of legionellae have not been correlated with disease."^{xxxi} Because of this, "[m]ost professional and government agencies that have issued Legionella position statements and guidelines, do not recommend testing for Legionella bacteria on a routine basis."^{xxxii} Even the CDC recommends testing only following an outbreak, which it defines as two or more confirmed cases of Legionnaire's Disease.^{xxxiii}

Fundamental legal tenets

While the Legionella science guiding the Court's decision was complex, the relevant laws were similarly nuanced. In the framework of a negligence action, the Court undertook a critical analysis of principles relating to legal duties, the appropriate standard of care and causation. The following points proved particularly important to the outcome of this case.

Owners owe a non-delegable duty to act reasonably to protect guests from foreseeable harm.

In Mississippi, as in most states, hotel owners have a non-delegable duty of reasonable care to protect invitees on hotel premises from reasonably foreseeable injuries.^{xxxiv} This legal proposition dictates that in most cases, the premises owner will be held to defend lawsuits arising out of guest injuries. Because the hotel owner was in bankruptcy in this case, the plaintiffs were left to identify other, solvent defendants.

In cases where the premises owner is a viable defendant, the authors believe that the foreseeability of harm and causation would be points of substantial focus. These issues were not reached in the instant lawsuit due to the hotel's status as insolvent.

Third parties owe no duty to guests unless voluntarily assumed

A third party, like the water treater, can only be liable for breaching a duty to protect hotel guests in Mississippi if it contracts to undertake or otherwise assumes a specific duty for the benefit of the guests.^{xxxv} "[I]n order for a third person beneficiary to have a cause of action, the contract between the original parties must have been entered into for his benefit, or at least such benefit must be the direct result of the performance within the contemplation of the parties as shown by its terms."^{xxxvi}

The appropriate legal standard is a duty of reasonable care.

To prove negligence, a plaintiff must prove (1) that the defendant owed him a duty of reasonable care; (2) the defendant breached that duty; and (3) the plaintiff suffered damages caused by the breach.^{xxxvii} The first element requires "the existence of a duty 'to conform to a specific standard of conduct for the protection of others against the unreasonable risk of injury."^{xxxviii} A precise standard of care may be established by statute, regulation, judicial decision, or the voluntary assumption of a duty by the defendant.^{xxxix} In the absence of such a binding directive, the law imposes a duty to undertake the same level of care that a reasonable person would employ under the same or similar circumstances. In other words, negligence law is concerned only with reasonable practices and not best practices.^{xl}

At the time this case was decided, there were "no federal or state statutes or agency-required mandates governing the operation or treatment of systems with the potential to amplify Legionella bacteria."^{xli} Similarly, there were no reported judicial decisions imposing duties related to the operation or treatment of cooling tower systems or the prevention or control of Legionella as a matter of law. The Plaintiffs therefore looked to the water treatment industry for evidence of what a reasonable water treater would have done under the circumstances.

There is no legally recognized industry standard of care.

Courts across the country that have considered whether a defendant owed a legal duty with regard to Legionella control have focused on the lack of regulation and an industry standard when dismissing negligence cases like this one prior to trial.^{xlii}

For example, in a Legionella case in Virginia, a federal court dismissed a plaintiff's claim that the defendant negligently operated and maintained a water treatment system.^{xliii} According to the *Flaherty* court, the fatal flaw in the case was that "[t]here is no controlling or even analogous ordinance or statute on water quality that could guide the trial judge in setting forth a proper jury instruction on the 'duty' element of negligence."^{xliv} In the absence of such a standard, the plaintiff, like the plaintiffs in this case, tried to "piece together" a standard of care by relying upon various publications and guidelines, including those published by OSHA and ASHRAE.^{xlv} The court noted, however, that the guidelines in these publications are "merely advisory."^{xlvi} Moreover, the publications themselves indicate that they should only be followed "when practical and appropriate." *Id.* Thus, the court concluded that "the guidelines and recommendations in the publications alone cannot establish the standard of care."^{xlvii}

Legal causation is difficult to establish based on current science.

Even if a defendant owes a duty to a plaintiff and fails to comply, or breaches that duty, a defendant cannot be held liable under a negligence theory without evidence that his breach was the cause of the plaintiff's damages. To establish the causation element for negligence, it must first be demonstrated that the defendant's conduct was, more likely than not, the cause-in-fact of the injury. In layman's terms, the plaintiff must show that his injury would not have occurred "but for" the defendant's conduct and that the injury was a reasonably foreseeable result of the conduct. A plaintiff must also show that the conduct was the proximate, or legal, cause. Proximate cause is "that cause which in natural and continuous sequence unbroken by any efficient intervening cause produced the injury and without which the result would not have occurred."^{xlviii} In other words, there must be a "reasonable connection between the defendant's breach and the injury suffered."^{xlix}

As the science demonstrates, Legionella's ubiquitousness means it necessarily exists independent of any negligence. Accordingly, courts have recognized that the presence of Legionella is not *ipso facto* evidence of negligence. See, e.g., *Taylor*, 2015 WL 751360, at *7 ("Legionella has been found to be present in all water sources; accordingly, the presence of Legionella in the water supply of [a particular building] could have occurred absent Defendant's negligence.").

Under Mississippi law, "[a] dose-response ratio is critical to determining the causal connection between a poison and an injury." The lack of any known correlation between Legionella concentration levels and the risk of contracting Legionnaire's Disease precludes the presentation of this type of evidence.

The Court's Opinion

The United States District Court for the Southern District of Mississippi dismissed the case as a matter of law on August 30, 2016 because the Plaintiffs failed to present sufficient evidence to establish the necessary elements of their negligence claims. Specifically, the court held that the Plaintiffs had failed to create a genuine issue of material fact on both duty and causation that would allow a jury to find in their favor.

Beginning with duty, the Court noted the lack of any evidence that either the hotel owner or the water treater intended for the water treater's services to include treatment to inhibit Legionella growth, that the hotel paid for those services, or that the water treater even offered such services. It then turned to the plaintiffs' experts' opinions that the water treater nevertheless had a duty to warn the hotel of Legionella risks and prevent or control Legionella in the hotel's cooling water system. Reasoning that the expert's opinions were premised upon industry "best practices," and that their opinions "conflict[ed] with essentially all of the regulatory, trade, and scientific reports that [the water treater] brought to the Court's attention—including statements from Plaintiffs' own experts," the court held the opinions unreliable and subject to exclusion.ⁱⁱ Without the opinions, Plaintiffs lacked any evidence that the water treater owed them a duty.

The Court again focused on the science in holding that the water treater's conduct was not the cause of the Plaintiffs' Legionnaires' Disease. The court began by noting that the Plaintiffs failed to acknowledge, much less address the "fairly extensive record" and arguments of the water treater with regard to causation. It then accepted the undisputed facts that the Legionella was introduced into the hotel's system via the municipal water system and that the bacteria is ubiquitous and impossible to eliminate. It further accepted that "high (even infectious) levels of Legionella have been found in otherwise well-maintained and operated tower systems"ⁱⁱⁱ and that no EPA-approved product for treating cooling towers claims to control or reduce Legionella. Finally, the court relied upon the evidence that the Legionella outbreak was not controlled until the dead legs in the dual pump arrangement were identified and eliminated, to hold that plaintiffs had failed to come forward with any evidence that water treatment could have prevented their injuries. In fact, the court noted that the four remediation attempts were evidence to the contrary.

Describing the trial court's opinion as "well-reasoned," the Fifth Circuit affirmed the trial court's opinion "essentially for the reason given by the district court."ⁱⁱⁱ

- i. It was uncontested that four of the five plaintiffs, including one who tragically died, contracted Legionnaire's Disease during their stays at the hotel. The fifth plaintiff, however, tested negative for the disease.

- ii. See MISS. CODE ANN. § 11-1-63.
- iii. See Cooling Tech. Inst., Legionellosis, Guideline: Best Practices for Control of Legionella 3 (July 2008), ("CTI").
- iv. WORLD HEALTH ORG., LEGIONELLA AND THE PREVENTION OF LEGIONELLOSIS 29 (2007), ("WHO").
- v. See CTI at 3-4; ASHRAE POSITION DOCUMENT ON LEGIONELLOSIS 7 (ASHRAE 1998) (2012) ("ASHRAE").
- vi. See WHO at 37; ASHRAE at 9.
- vii. WHO at 29.
- viii. Id. at 72.
- ix. Brian G. Shelton, William Kervel, Linden Witherell & J. Donald Millar, REVIEW OF LEGIONNAIRES' DISEASE, 61 AIHA Journal, 739 (2000) ("AIHAJ").
- x. ASHRAE at 6.
- xi. Id. at 4.
- xii. WHO at 76.
- xiii. Association of Water Tech., Legionella 2003 17 (2006), ("AWT").
- xiv. ASHRAE at 9.
- xv. WHO at 32 (explaining that Legionella's survival and growth is dependent on protozoa and biofilms in both natural and artificial environments).
- xvi. *Range v. Ford Motor Co.*, 412 F. Supp. 2d 732, 734-35 (N.D. Ohio 2005).
- xvii. Id. ("There are no Federal or State statutes or agency-required mandates governing the operation of systems with the potential to amplify Legionella bacteria, nor are there any Federal or State guidelines regarding what constitutes a safe or unsafe Legionella exposure level").
- xviii. *Taylor v. Aria Resort & Casino, LLC*, Case No. 2:11bcv-01360, 2015 WL 751360 (D. Nev. 2015).
- xix. WHO at 36.
- xx. Id. at 34.
- xxi. Id. at 36 (citing John Lee, Health Protection Agency, UK personal communication, June 2005).
- xxii. Id. at 76.
- xxiii. Id. at 78.
- xxiv. Id. at 36.
- xxv. ASHRAE at 8.
- xxvi. CTI at 5; WHO at 192; ASHRAE at 9.
- xxvii. CTI at 5; ASHRAE at 9.
- xxviii. CTI at 5.
- xxix. WHO at 192.
- xxx. ASHRAE at 9.
- xxxi. Id. at 9.
- xxxii. CTI at 5.
- xxxiii. WHO at 211.
- xxxiv. *Alqasim v. Capitol City Hotel Investors, LLC*, 989 So. 2d 488, 491 (Miss. Ct. App. 2008). See also 40A Am. Jur. 2d, Motels, Etc. §97 ("The duties imposed on an innkeeper for the protection of guests are not delegable, and liability is not avoided on the ground that the performance was entrusted to an independent contractor.").

- xxxv. *Smith v. Miss. Security*, 2010 WL 2723116, at *3 (S.D. Miss. July 6, 2010) (quoting *Doe v. Wright Security Servs., Inc.*, 950 So. 2d 1076, 1080 (Miss. Ct. App. 2007)).
- xxxvi. *Id.* (quoting *Rein v. Benchmark Const. Co.*, 865 So. 2d 1134, 1146 (Miss. 2004)).
- xxxvii. See *Hayes v. United States*, 899 F. 2d 438, 443 (5th Cir. 1990).
- xxxviii. See, *Donald v. Amoco Prod. Co.*, 735 So.2d 161, 174 (Miss. 1999).
- xxxix. See Restatement (Second) of Torts § 285; see also, *Melrine v. Avondale Shipyards, Inc.*, 659 F.2d 706, 713 n.2. (5th Cir. Unit A Oct. 1981).
- xl. *Ewans v. Wells Fargo Bank, N.A.*, 389 F. App'x 383, 390 (5th Cir. 2010).
- xli. *Range v. Ford Motor, Co.*, 412 F. Supp. 2d 732, 735 (N.D. Ohio 2005).
- xlii. *Taylor v. Aria Resort & Casino, LLC*, 2015 WL 751360, at *3 & n.39 (D. Nev. 2015) (citing *Vellucci v. Allstate Ins. Co.*, 66 A.3d 215, 226 (N.J. Super. Ct. App. Div. 2013)); *Range*, 412 F. Supp. 2d at 738.
- xliii. *Flaherty v. Legum & Norman Realty, Inc.*, 2007 WL 4694346, at *4 (E.D. Va. Jan. 4, 2007), *aff'd sub nom. Flaherty v. Legum & Norman Realty, Inc.*, 281 F. App'x 232 (4th Cir. 2008).
- xliv. *Id.* at *6.
- xlv. *Id.* at *14–15.
- xlvi. *Id.* at *15.
- xlvii. *Id.*
- xlviii. *Patterson*, 910 So.2d at 1019.
- xlix. *Dickey*, 146 F.3d at 267.
- l. *Sherwin-Williams Co. v. Gaines ex rel. Pollard*, 75 So.3d 41, 45 (Miss. 2011) (citing *Watts v. Radiator Specialty Co.*, 990 So.2d 143, 147 n. 9 (Miss.2008) ("A dose-response ratio is needed to indicate the level of exposure to benzene of the subjects of the study. This information is crucial under the case-study methodology to show specific causation so that Watts's level of exposure could be specifically compared to subjects with similar exposure.")).
- li. Civil Action No. 3:13-cv-423-DPJ-FKB (S.D. Miss. Aug. 30, 2016), *aff'd*, 2017 WL 2713436 (5th Cir. June 22, 2017).
- lii. *Id.* (quoting AWT at 17).
- liii. 2017 WL 2713436 (5th Cir. June 22, 2017).



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