

State of Wisconsin



Labor and Industry Review Commission

Michael H. Quint (Dec'd)
c/o Victoria Quint
Applicant

City of Watertown
City Clerk
Employer

League of Wis Municipalities Mut.
c/o United Wisconsin
Insurer

Claim No. 2017-002599

Worker's Compensation Decision¹

Dated and Mailed:

November 30, 2023

quintmi_wrr.doc:190

Order

The commission **reverses** the decision of the administrative law judge. Accordingly, within thirty (30) days, the Department of Employee Trust Funds shall compute and pay the benefits due for duty disability benefits consistent with the provisions of Wis. Stat. § 40.65.

By the Commission:

/s/

Michael H. Gillick, Chairperson

/s/

Georgia E. Maxwell, Commissioner

/s/

Marilyn Townsend, Commissioner

¹ **Appeal Rights:** See the yellow enclosure for the time limit and procedures for obtaining judicial review of this decision. If you seek judicial review, you **must** name the following as defendants in the summons and the complaint: the Labor and Industry Review Commission, and all other parties in the caption of this decision or order (the boxed section above). Appeal rights and answers to frequently asked questions about appealing a worker's compensation decision to circuit court are also available on the commission's website, <http://lirc.wisconsin.gov>.

Procedural Posture

This case is before the commission to determine the applicant's eligibility for duty disability benefits under Wis. Stat. § 40.65. The applicant, through his widow, Victoria A. Quint, filed an application for duty disability benefits, but the application was denied because the employer refused to certify the applicant's death as being duty related. The respondent conceded jurisdictional facts, but denied all claims and asserted that the cancer that caused the applicant's death was not related to his work activities. The parties resolved a worker's compensation claim for the same alleged injury after mediation by compromise order, leaving open the applicant's claim for duty disability benefits. An administrative law judge for the Department of Administration, Division of Hearings and Appeals, Office of Worker's Compensation Hearings, heard the matter related to duty disability benefits on December 13, 2022, and issued a decision dated February 6, 2022, denying the claim for duty disability benefits and dismissing the hearing application. Mrs. Quint then filed a timely petition for commission review.

The issue is whether the applicant's work exposure as a firefighter was at least a material contributory causative factor in the onset or progression of his rare bile duct cancer (cholangiocarcinoma), from which he died, such that his widow is entitled to duty disability benefits under Wis. Stat. § 40.65. The commission has considered the petition and the positions of the parties, and it has independently reviewed the evidence. Based on its independent *de novo* review, the commission reverses the decision of the administrative law judge, and makes the following:

Findings of Fact and Conclusions of Law

The Applicant's Work Exposure

1. Victoria Quint married the applicant in March 1991, and the marriage did not end until his death of metastatic biliary tract cancer on December 11, 2012. At the time of his death, they had been married 21 years. The applicant was very passionate about the fire service, and he had 5 degrees, including 2 associate degrees, a bachelor's degree in music, a second bachelor of science degree in fire science, and a master's degree in music. The applicant had worked for various fire departments since they were married. He had worked for the Rock Hills Fire Department in Missouri, and simultaneously worked at Prairie du Pont in East Carondelet, Illinois, as a volunteer. In 2002, he went to work for the employer in Watertown at the Watertown Fire Department. When he left Watertown, he worked as the fire chief for the City of Litchfield, Illinois. Including the time before they were married, the applicant had worked in fire service for 35 years. He ended his employment with the fire service in November 2012, shortly before he died.
2. Mrs. Quint observed the applicant personally fight fires in the various departments where he worked from 1987 through 2009, and the last department where he personally fought fires was in Watertown. As fire chief in Litchfield, the applicant would respond to calls as the one in charge, but he was not

personally fighting fires.² For the fires he did attend as fire chief and served as incident command, the applicant spent a total of 33 hours.³

3. The applicant began working for the employer in Watertown in June 2002 as an assistant fire chief training officer. The applicant would talk to Mrs. Quint about his working conditions, and she sometimes went on calls with him if they were out together and there was an emergency call. She understood his job to be filling in for the fire chief, doing the training schedule for the 38 firefighters, and going on any call that the fire chief attended, which mostly meant anything other than an EMS call. When he fought fires, he had to be in and out of the fire. Mrs. Quint estimated that she personally saw the applicant fight in approximately 8 fires in Watertown, mainly structural fires. At those fires, the applicant wore a white helmet with a shield plate, bunker gear, a bunker gear coat top, bunker pants, fire boots, gloves, and a self-contained breathing apparatus (SCBA) air tank that held 30 minutes of air. Mrs. Quint observed the applicant come home from fires smelling of fire, dirt, and soot, as well as petroleum-type products, which she described as a “thick smell, it’s heavy. It’s hard to get off of anything.” She handled his laundry. When he was not fighting fires, the applicant took care of the training schedule and training classes. He did assignments from the fire chief, community engagements, and grant writing. His office was adjacent to the apparatus bay. Mrs. Quint had personally visited the fire station many times.⁴
4. Mrs. Quint recalled the specific 2005 Watertown Tire Fire that lasted 6 days. She visited the applicant at this fire when he was the overall incident commander. The applicant only allowed her to visit him at this fire once for about 20 minutes. At that site, she saw heavy black smoke, and it stank terribly of dirt, soot, and chemicals. She could smell it at her house 2 miles away. The firefighters did not wear SCBA because it was not an internal structure fire; it was outdoors. The applicant was at the fire for the 6 days, except for one night when he came home for a brief time. When the applicant came home from the fire, Mrs. Quint observed that he smelled of soot and petroleum, and his face was completely covered in a coating of black. After this fire, she witnessed the applicant have extra phlegm in his throat that he was coughing and some respiratory things that worked themselves out. After the Tire Fire, the applicant continued to work for the employer for another 5 years and continued to respond to fire calls.⁵
5. Mrs. Quint noted that the applicant was not a smoker and never drank. Though his mother and brother had died of cancer, she was not aware of any family history of the kind of cancer the applicant had. The applicant was diagnosed with cancer in April 2012 and died in December 2012.⁶ The actual medical

² Transcript of Proceedings dated December 13, 2022 (Tr.), pp. 18-21, 32-34; *see also* Exhibits (Exs.) A, B.

³ Tr., p. 44.

⁴ Tr., pp. 21-26, 48-49.

⁵ Tr., pp. 27-31.

⁶ Tr., p. 34-35, 48.

records regarding the applicant's cancer treatment are not in evidence, but there is no evidence that the parties disputed the treatment the applicant received and that it was for cholangiocarcinoma.

6. Since the applicant died, Mrs. Quint has been involved as a volunteer in firefighting advocacy by attending fire chief conferences throughout the United States, and working with the National Association of State Fire Marshals, the International Association of Fire Chiefs, and the International Association of Firefighters. Her advocacy involves serving as the co-chair of the Foam Exposure Committee and providing information about chemicals in bunker gear. She also has written articles and commentaries for various firefighting magazines. She personally had never worked for a fire department, but she did help the applicant with his training materials.⁷
7. Kraig Biefeld, the former fire chief for the City of Watertown, provided additional information about the nature of the applicant's work exposure. Mr. Biefeld had recently retired after 29 years of fire service. During the time the applicant had worked for the employer, Mr. Biefeld worked as a firefighter paramedic until he became assistant chief director of EMS in 2008. He became the fire chief in 2017. After the applicant left in 2009, Mr. Biefeld took on his responsibilities until he became the fire chief. According to Mr. Biefeld, the assistant chief of training would work 8 a.m. to 4:30 p.m., Monday through Friday, plus 24/7 calls. The applicant would have evaluated the training, come up with training and worked with shift commanders in getting the training they needed. He also conducted training and evaluated members on their performance. He also worked on policies, budget, grant writing, preparing reports, doing performance reviews, and community relations. Mr. Biefeld thought the duties of the assistant fire chief were mostly behind a desk.
8. According to Mr. Biefeld, the Watertown Fire Department had about 23 or 24 structural fires per year, the rest were false alarms and car accidents, car fires, and wildland fires. About 20% of their calls were fire calls, and Mr. Biefeld estimated that 5% to 7½% of calls were for structural fires. He noted, however, that while an EMS call might be 45 minutes, a fire call could take up to 5 hours on the scene. When firefighters went to fires, they used turnout gear consisting of boots, turnout pants, jacket, gloves, and helmet. The materials were protective up to 600 degrees. SCBAs would be worn inside a house or for interior operations when there were high levels of carbon monoxide or poor air quality.⁸
9. Mr. Biefeld felt that the fire department has gotten safer since the applicant worked there. In the past, houses were built with wood and cotton, and they did not use SCBAs. However, now there are a lot of petroleum-based products that off-gas, and a lot of other products. In the last 10 years, they have been more concerned about hydrogen cyanide, so they are washing gear more often.

⁷ Tr., pp. 35-40; *see also* Ex. H.

⁸ Tr., pp. 52-63, 67-69, 71.

Everyone now gets two sets of turnout gear to have a second set while the first set is being washed. If the turnout gear is not regularly washed, it can build up with contaminants and you can bring that home. When the applicant worked for the employer, they only had one set of turnout gear. Based on his knowledge as a long-time firefighter and fire chief, Mr. Biefeld found that firefighters are exposed to lights and alarms going off, diesel exhaust, and unknown things, including explosives. They are also exposed to dangerous substances, including carbon monoxide and byproducts of whatever the materials are made of, including hydrogen cyanide and heated gasses. Mr. Biefeld saw the applicant at the 2005 Watertown Tire Fire. This fire was not like any other fire Mr. Biefeld had fought in his career, due to its length and magnitude.⁹

10. A position description for assistant chief–director of training included specific accountabilities, but it did not assign percentages of time to each activity. The activities included working with staff to develop written goals and objectives for the training division; including develop, organize, and implement and maintain a department-wide training program; scheduling and conducting training; planning, directing, and organizing department operations; assist in preparing budgets; participating in staff meetings; evaluating staff; responding to all fire and major emergency alarms, directing personnel, as may be required, in extinguishing the fire or resolving the emergency; preparing special reports; developing new methods of performing various techniques; dealing with training activities to handle hazardous materials, mutual aid, and water rescue; and such other duties as assigned.¹⁰ A performance appraisal report from 2003 indicated the applicant’s performance was excellent and distinguished. It also noted that the number of training classes/drills and training hours had increased dramatically, 112.5% and 240% respectively.¹¹

The Watertown Tire Fire in 2005

11. The Wisconsin Department of Justice (DOJ) Division of Criminal Investigation investigated the Watertown Tire Fire and prepared a report in August 2005.¹² According to the DOJ report, the fire occurred on July 19, 2005, at approximately 9:58 a.m. at Watertown Tire Recyclers, LLC. The report indicated that a total of 48 fire departments were on the scene during the fire suppression efforts, including the Watertown Fire Department. Police and Department of Natural Resources (DNR) staff were also on the scene. The property was a commercial waste tire storage/processing facility. The temperature was 85 to 90 degrees, and the winds were very light. When the Watertown fire department responded to the report of fire, they observed heavy smoke from the streets of Freemont and Main Street in Watertown. When they arrived, a section of tires approximately 50’ x 50’ x 35’ was fully involved in fire. The fire then extended to other tire piles and encompassed approximately 5 to 6 acres. Additional mutual aid fire companies were called. The fire department maintained active fire units on the

⁹ Tr., pp. 72-76, 78, 81.

¹⁰ Ex. 5.

¹¹ Ex. 6.

¹² Ex. E.

fire scene until July 24th. The tire piles were a combination of old 1” tire chips and recycled rubber crumbs that were stacked 12 to 15’ feet high. A DNR employee, on scene at the time the fire began because she was following up on bringing the business into compliance with DNR codes, took several pictures of the fire, which are in Exhibit E. The pictures are in black and white, but they show large black plumes of smoke, and firefighters not wearing respiratory protection. Investigators subsequently determined that the fire was caused by the pre-heated shredded tire product debris in combination with an end loader machine that was operating while buried up to its axel and engine compartment. The hot and humid conditions contributed to the conditions of continuing heating in the pile. With the additions of the actions of the end loader and the addition of mechanical heating of the tire material, the tire debris reached a condition for ignition.

The Industrial Hygienist Report

12. The applicant submitted a report of Dawn Bolstad-Johnson, MPH, CIH, CSP, FAIHA, dated November 22, 2017.¹³ The respondent objected to receiving this report into evidence at the hearing because Ms. Bolstad-Johnson was not a physician and did not appear at the hearing. The administrative law judge received it into evidence over the respondent’s objection for the purpose of reviewing the background information contained in the report, but not for use of medical proof or medical information.¹⁴ Ms. Bolstad-Johnson noted that smoke contains carbon monoxide, hydrogen cyanide, poly nuclear aromatic hydrocarbons (PAHs), formaldehyde, other aldehydes, asbestos, metals, isocyanates, respirable particulates, nitrogen dioxide, sulfur dioxide, etc. She indicated that “the list is really endless, as we do not fully understand the effects of pyrolysis to all of the synthetic materials that compose the contents of our homes.” Ms. Bolstad-Johnson noted that the Watertown Tire Fire was representative of a significant exposure to numerous carcinogens, respirable size particulates, and other toxic chemicals.
13. Attached to Ms. Bolstad-Johnson’s report is the Health Consultation report prepared by the U.S. Department of Health and Human Services (DHHS) on the Watertown Tire Fire, dated April 11, 2006. The DHHS report concluded that the fire posed a public health hazard to on-site workers, nearby residents, and to the firefighters who were called to fight the fire. Air sampling results confirmed high particulate levels in the smoke and presence of pyrolytic compounds. Airborne levels of particulate matter on-site and in the smoke plume exceeded the U.S. EPA 24-hour National Ambient Air Quality Standards (NAAQS) and in some cases represented a public health hazard. The report noted that the flames rose over 100’ and smoke was visible for 30 miles and observed on satellite imagery. The smoke was determined to be a respiratory irritant, and the public was advised to limit outdoor activity. Over the course of the days of the fire, the air

¹³ Ex. D.

¹⁴ Tr., pp. 10-11. The commission has also relied on this report only for the background information provided about the Watertown Tire Fire and chemical exposures.

changed and the plume conditions changed. Residents near the site were offered voluntary evacuation assistance. The report indicated that the fire response involved 106 departments. Some residents expressed concern about their livestock and vegetables. The residents were advised to use N95 masks. Regarding responder exposures, the report noted:

Particulate levels were observed near the fire scene that exceeded occupational exposure guidelines, resulting in potentially high exposures to fire fighters and other present near the scene. While fire fighters engaged in response operations closest to the fire were generally in breathing apparatus, others near the fire generally were not using respiratory protection. ...On-scene fire command staff trained the equipment operators in breathing apparatus use, and WI DPH coordinated with a local physician in providing training and medical review in OSHA 29CFR1910.134. N95 respirators were secured from a number of sources by Watertown Health Department and provided to those who were working at and visiting the fire scene.¹⁵

14. Environmental data was also sampled. For air data, acute minimal risk levels were exceeded on a number of occasions for hydrogen sulfide and sulfur dioxide at several locations. Carbon monoxide levels above minimal risk levels were also observed. The high levels of volatile organic compounds likely represented an undesirable exposure. "As would be expected from a tire fire, a number of pyrolytic compounds, such as benzene, toluene, trimethylbenzene, and styrene were observed in sample results." The benzene value met or exceeded an acute minimal risk level at two locations near the fire. The report noted that the fire fighters in particular were exposed to high levels of fine and ultrafine particulate at various times during the fire. When the smoke plume was near the ground, particulate levels often exceeded recommended exposure limits for occupational environments. Exposure also occurred to gases such as carbon monoxide and benzene. PAHs and metals had been detected in the soil and would require remediation. The report noted that among the health concerns associated with breathing fine and ultrafine particulate, were lung injury and inflammation, increased cardio-respiratory effects and lung cancer, and potential for toxic gases to be carried deeper into the lungs. Some particulate matter was more toxic than others. The report recommended that in future similar events, firefighters should be closely evaluated for respiratory protection needs. They should use N95 respirators near the smoke plume, and personnel should consider using respirators to reduce the volatile organic compound exposure.

The Applicant's Expert Medical Opinions

15. The applicant submitted an extensive report and WKC-16-B from Dr. Barbara A. Cochran, M.D., dated February 19, 2018.¹⁶ In her report,

¹⁵ Ex. D, p. 35.

¹⁶ Ex. C.

Dr. Cochran stated, “The medical records and some of the employment records of Michael Quint were reviewed in order to do a causation analysis and form a causation opinion as to his terminal and fatal metastatic cholangiocarcinoma.” In the next paragraph, she stated, “By narrative of the opinion written by David Blake, an oncology consultant, the following is Mr. Quint’s medical history as I do not have his actual medical records...” The report then describes the medical history as stated by Dr. Blake in his report. Dr. Cochran also described the applicant’s occupational history working as a firefighter and fire marshal since being a volunteer in 1976. For the Watertown Fire Department, Dr. Cochran stated that the applicant worked there from 2002 to 2010 as a training officer, and that he retired in 2010. “In these capacities, he participated in fire suppression, overhaul, and controlled training burns.” She noted that he participated in fire suppression and overhaul, with the known exposure of multiple carcinogens and presumed carcinogenic agents, including carbon monoxide, soot, benzene, phosgene gas, particulate matter, asbestos, formaldehyde, polycyclic aromatic hydrocarbons (PAH), diesel/fuel and exhaust materials. She noted that ongoing exposures from the detritus of fires remaining on the equipment was well documented in the medical literature. She also noted that Dr. Blake accurately and appropriately stated that cholangiocarcinoma is a rare cancer that tends to be aggressive. However, she stated that Dr. Blake’s statement that the exact cause of cholangiocarcinoma is unknown was only partially accurate. She opined that “A more appropriate characterization would be ‘the etiology is poorly understood.’”

16. Dr. Cochran cited a medical study, “Risk factors for intrahepatic and extrahepatic cholangiocarcinoma in the United States: a population-based study in SEER-Medicare,” for reporting some of the risk factors for the cancer, which included obesity, smoking, diabetes, gout, bile duct conditions, and some autoimmune conditions.¹⁷ There was no evidence that the applicant had any of these conditions.
17. Dr. Cochran also stated that Dr. Blake was correct that a specific cause of a specific exposure to an agent had not been shown in the medical literature. She noted, “However, that does not mean that the medical literature does not show risk factors for the development of this particular type of cholangiocarcinoma.” She noted, for instance, that in many states, particularly in firefighters, there is a presumption based on medical literature that showed a marked increase in risk for the development of specific types of cancer, with an example being prostate cancer. According to Dr. Cochran, “when one does a causation analysis, one weighs the entire spectrum of medical literature and data.” One of the problems with cholangiocarcinoma was that there is “a paucity of data because of the lack of sufficient subjects and comparison to study against the baseline population.”

¹⁷ Petrick, et al., *Risk factors for intrahepatic and extrahepatic cholangiocarcinoma in the United States: a population-based study in SEER-Medicare*, PLoS One, 2017 Oct. 19; 12(10). [Citations are as provided in Dr. Cochran’s report.]

18. Dr. Cochran presented extensive literature showing the exposure of firefighters to carcinogens as defined by the International Agency for Research into Cancer (IARC) and in the occupational medical literature.¹⁸ She cited articles that multiple exposures at fire scenes include, but are not limited to asbestos, benzene, polycyclic aromatic hydrocarbons (PAH) formaldehyde, diesel fumes, phosgene gas, fine particulate matter, smoke, arsenic. She noted, “With the advent of newer manufacturing, off gassing from the burning of components occurs with a wide variety of inhalational exposures not completely known or studied.” This includes plasticizers, which has been found in the personal protective clothing of firefighters. Of particular interest, Dr. Cochran cited to the following articles:

- “Environmental and chemical carcinogenesis,” Wogan, et al., *Seminars in Cancer Biology* 2004; 14:473-486. There are **multiple exposures at a fire scene including but not limited to asbestos, benzene, polycyclic aromatic hydrocarbons (PAH), formaldehyde, diesel fumes, phosgene gas, fine particulate matter, smoke, and arsenic, all of which are known or strongly suspected to be carcinogenic.**
- “An Epidemiologic Study of Cancer and Other Causes of Mortality in San Francisco Firefighters,” Beaumont, *American Journal of Industrial Medicine*, 1991 Vol. 19, pp. 357-372. Noting that **exposures to smoke include benzene, hydrogen chloride, PAH, chlorine, acrolein, formaldehyde, acetic acid, formic acid, oxide of nitrogen, phosgene, hydrogen cyanide, carbon monoxide, dioxins, polychlorinated biphenyls, and acetyl acetaldehyde. From building materials, exposures included asbestos and lead. From diesel exhaust, there were PAHs, benzopyrene, sulfur dioxide, and oxides of nitrogen. From the firefighting equipment itself, carbon tetrachloride, NOCA, and asbestos.**
- “Registry-based case controlled study of cancer in California firefighters,” *American Journal of Industrial Medicine*, Bates, Michael, 50:339-344 in 2007. **Firefighters were exposed to numerous products of combustion including PAHs, formaldehyde, benzene, chromium compounds, dioxin, asbestos, particulates, and arsenic, all of which are known and strongly suspected carcinogens.**
- “Plasticizer contamination of firefighter personal protective clothing – a potential factor in increase health risks in firefighters,” *Journal of Occupational and Environmental Hygiene*, May 2014, Lacey, et al. **Plasticizer DEHP added to PVC for flexibility was found in every swatch of**

¹⁸ The World Health Organization International Agency for Research on Cancer (IARC) prepares monographs evaluating carcinogenic risks to human representing the views and expert opinions of IARC working groups. The commission has considered reports by the IARC in other cases. See, e.g., *Clark v. PPG Indus., Inc.*; WC Claim No. 2016-010868 (LIRC Aug. 7, 2020).

firefighter equipment and was the highest concentration of any of the chemicals measured. DEHP is characterized as a possible human carcinogen.

- “Exposure of firefighters to particulates and polycyclic aromatic hydrocarbons,” J Occup. Environ. Hyg., 2014; 11(7):D85-91, Baxter, CS, et al. **Exposures are complex, involving mixtures of particles and chemicals, such as PAHs. Adverse health effects associated with these agents include elevated incidences of coronary heart disease and several cancers.**
- “Mortality and cancer incidence in pooled cohort of US firefighters from San Francisco Chicago, and Philadelphia (1950-2009), Occupational and Environmental Medicine, 71, 388-97 (2014) Daniels, R.D., et al. **Primary increase in digestive and respiratory cancers.**
- “Causal relationship from exposure to chemicals in oil refining and chemical industries and malignant melanoma,” Mehlman, MA, Annals of the New York Academy of Sciences, 1076, 822-823 (2006). **Firefighters are exposed to diesel fuel and diesel fuel exhaust has been documented. Diesel fuel is a Class 1 carcinogen defined by IARC.**
- “Firefighting instructors’ exposures to polycyclic aromatic hydrocarbons during live fire training scenarios,” Kirk, KM, and Logan, MB. J. Occup. Environ. Hyg., 2015; 12(4): 227-34. **Cumulative exposures to firefighting instructors to toxic contaminants generated from live-fire training potentially far exceeded firefighter exposures arising from occupational fires. The findings suggested that firefighting instructor exposures to PAHs during a single live-fire training evaluation are comparable with exposures occurring in industrial settings over a full shift.**
- “ATSDR evaluation of health effects of chemicals,” Mumtaz, MM, et al. Toxicol. Ind. Health, 1996 Nov-Dec; 12(6): 742-971. **PAHs are a group of chemicals formed during the incomplete burning of coal, oil, gas, wood, garbage, and other organic compounds. PAHs generally occur as a complex mixture, not as single compounds. PAHs are excreted through the bile ducts and urine.**
- “The epidemiology of cholangiocarcinoma,” Shaib, YS, and El-Seraq, HB. Semin. Liver Dis., 2004 May; 24(2): 225-25. **There are well-established risk factors for cholangiocarcinoma, including primary sclerosing cholangitis, liver fluke infestations, hepatolithiasis, Thoratrast exposure, and choledochal cysts. Dr. Cochran notes that a known Class 1 carcinogen that is excreted through the bile ducts is very important in assessing the risk of development of cholangiocarcinoma. Not all cancers have defined exact causative agents.**
- “Occupational exposure to asbestos and risk of cholangiocarcinoma: a population-based case-control study in four Nordic countries,” Farioli,

Andrea, et al., *Occup. Environ. Med.*, 2018 Mar; 75(3):191-198. Study supported the hypothesis that **occupational exposure to asbestos was a risk factor for intrahepatic cholangiocarcinoma, while no evidence was observed for extrahepatic cholangiocarcinoma. Evidence was indicative of a dose-response relationship.**

- “Asbestos: a hidden player behind cholangiocarcinoma increase? Findings from a case-control analysis,” Brandi, G., *Cancer Causes Control*, 2013, May; 24(5):911-8. **Increased risk of intrahepatic cholangiocarcinoma in workers exposed to asbestos.**
- “The risk of cancer in firefighters,” Golden, AL, et al., *Occup. Med*, 1995 Oct-Dec; 10(4):803-20.¹⁹ Findings include a **substantial body of literature now exists on the carcinogenic hazards of firefighting. Carcinogens include benzene, asbestos, PAHs, formaldehyde, diesel exhaust. This includes off-gassing of materials and particulate matter from the elements of combustion depending on the fire.**
- “Environmental and Occupational Causes of Cancer New Evidence,” Clapp, et al., 2005-2007, *Review of Environmental Health* 2008; 23(1); 1-37. **Risk factor for liver and biliary cancer is PCB exposure. Other agents linked to hepatobiliary or liver cancer include agents found at fire and overhaul scenes, including arsenic, vinyl chloride from plastic pipes, floor coverings, and electrical applications. Trichloroethylene (TCE) found in paints, adhesives, and leakage from industrial settings is also strongly linked to hepatobiliary cancer.**

19. Dr. Cochran opined that the personal protective equipment worn by the applicant was contaminated with PAH, which is classified as a class 1 carcinogen by the IARC. She stated that PAH exposure may cause hepatotoxicity with elevated transaminase levels, causing inflammation in the liver. The pathophysiologic mechanism is that the inflammation causes the genetic changes in the DNA and RNA sequencing at the molecular and metabolic pathway level, which may result in a progression to frank carcinoma at the site of the inflammation.

20. Dr. Cochran erroneously found that the applicant retired in 2010 rather than that he had stopped fighting fires in 2009. The applicant did not retire in 2010.²⁰ Regardless of that misunderstanding, Dr. Cochran found that the applicant became symptomatic in late 2011, and because the cancer is aggressive, she addressed latency. He was stage IV when diagnosed, meaning the cancer was

¹⁹ The full text of this article was submitted to the Legislature when it was considering 1997 Senate Bill 329, Report of Joint Survey Committee on Retirement Systems, LRB-1538/3, and enacting Wis. Stat. § 891.455.

²⁰ Tr., p. 46.

likely already present in 2010. According to Dr. Cochran, the delay in symptoms was consistent with a latency period for several medical conditions.

21. Dr. Cochran then laid out her causation analysis. Though there was not data specific to cholangiocarcinoma, Dr. Cochran indicated that “Absence of data is not the same as not understanding or knowing there is increased risk. There is simply just not enough data to make an appropriate statistical analysis using Bayesian analysis.” Nevertheless, based on the available data, Dr. Cochran reasoned that the type of cancer the applicant had, intrahepatic cholangiocarcinoma, is associated with exposures of the firefighters, as noted in the literature. The literature shows that personal protective equipment is insufficient protection from exposure to PAHs. The applicant’s cancer occurred in the bile ducts. PAH is metabolized in the liver and excreted in the bile and urine. This is the pathophysiologic mechanism for carcinogenesis. The concentrations of PAHs that firefighters are exposed to is magnitudes different than that in the environment and food. The current thinking about carcinogenesis of any carcinoma is that the substance causes an inflammatory reaction, which alters the DNA and RNA. Other studies about cholangiocarcinoma in general have implicated inflammation in the form of biliary cholangitis. Dr. Cochran noted the applicant had no other factors that would cause this cancer, like liver flukes.
22. Dr. Cochran opined that the peer-reviewed medical literature supported the epidemiology of the disease, and she concluded that the carcinoma was work-related. She stated, “In evaluating the totality of the medical literature as a whole as well as the exposures that Chief Quint experienced during his firefighting career and in particular his exposures to diesel exhaust and fumes as well as PAH, it is my expert opinion and stated to a reasonable degree of medical certainty that these exposures caused the development of intracellular cholangiocarcinoma in Chief Quint. To a reasonable degree of medical certainty, Mr. Quint’s cholangiocarcinoma (ICC) is causally related to his exposures to multiple class I carcinogenic agents and his career as a firefighter. These include, but are not limited to, PAH, asbestos, formaldehyde, benzene, and diesel fumes.” In her WKC-16-B, Dr. Cochran opined that the applicant’s work exposure was at least a material contributory causative factor in the onset or progression of his cancer. Based on the literature that suggested that firefighting instructors were exposed to greater carcinogenic agents, Dr. Cochran noted that the applicant had magnitudes more carcinogenic exposures than the average firefighter in suppression and overhaul alone.
23. Dr. Cochran stated that not all cancers have defined exact causative agents, including cancers with a high incidence in the population. However, she opined that “Absence of data in sufficient quantity to establish statistical significance, is not equivalent to no relationship or risk.” Dr. Cochran noted that because cholangiocarcinoma is a very rare cancer, the number of cases seen in studies for firefighters is small. “This makes the analysis difficult for any possible correlation using standard mortality ration (SMR), odds ratio (OR), and relative

risk (RR), as well as variations on these in the medical literature. ... use of other statistical measures such as Bayesian analysis, which is a statistical analysis for a small number of 'n' have not been used because, while the numbers for cholangiocarcinoma are small until themselves, the number of individuals involved in each study is significantly larger.”

24. The applicant also submitted a WKC-16-B dated April 28, 2017, from Dr. Victor Lanzotti, M.D., the applicant’s treating oncologist in Illinois.²¹ Dr. Lanzotti opined that the applicant’s years of work exposure to smoke, fires, and toxic chemicals as a firefighter was at least a material contributory causative factor in the onset or progression of the applicant’s intrahepatic cholangiocarcinoma. He attached various records of the applicant’s time spent on the Watertown Tire Fire, indicating the applicant had spent 120 hours on this fire. However, Dr. Lanzotti is not licensed in Wisconsin.

The Respondent’s Expert Medical Opinions

25. The respondent relies upon the medical records review and WKC-16-B of Dr. David G. Blake, M.D., an oncology consultant, dated November 2, 2017.²² Dr. Blake reviewed the applicant’s medical records from December 7, 2011, when he first visited his primary care physician with complaints of gastric pain, until December 11, 2012, when he died. He did not have details of the events immediately preceding his death in the medical records. Dr. Blake also reviewed the report of Dr. Lanzotti and data concerning the Tire Fire. He noted that the applicant had a 25-year history of working as a firefighter. He noted, “In that capacity, he was exposed to various chemicals and toxins including benzene and toluene at a large tire fire in 2006.”
26. According to Dr. Blake, cholangiocarcinoma (cancer of the bile ducts) is a rare gastrointestinal tract cancer that tends to be aggressive, metastasizing early and most commonly detected when cure is no longer possible. He noted that worker’s compensation claims for cancer are not subject to presumption of causation for firefighters, “as a duty disability claim would be.” He stated, “In the medical literature and textbooks, the first sentence in any discussion of causation is often: ‘The exact cause of cholangiocarcinoma is unknown.’ This is consensus medical opinion and answers the question: What causes cholangiocarcinoma?” Dr. Blake noted that there had been speculation about certain chemicals and medical conditions playing a role, but they remain associations and not documented causes. “The medical literature fails to provide proof of causation for any individual toxin or chemical in cases of cholangiocarcinoma including toluene or benzene.” He found no evidence in the medical record causally linking the applicant’s cancer with his employment. He therefore opined that the applicant’s cancer was not causally related to his employment as a firefighter.

²¹ Ex. F.

²² Ex. 1.

Conclusions of Law

27. The applicant's work exposure as a firefighter for several decades exposed him to numerous toxic and carcinogenic agents, including, but not limited to, PAHs, asbestos, formaldehyde, benzene, and diesel fumes. The applicant had no other risk factors for developing cholangiocarcinoma.
28. The last employer for whom the applicant had work exposure fighting fires was the City of Watertown Fire Department.
29. The commission credits Dr. Cochran that the applicant's work exposure was at least a material contributory causative factor in the onset or progression of his cholangiocarcinoma, from which he died.
30. The applicant is entitled to duty disability benefits under Wis. Stat. § 40.65. Accordingly, the administrative law judge's decision is reversed.²³

Memorandum Opinion

The applicant, Michael Quint, worked for about 35 years as a firefighter. From 2002 to 2009, he worked as an assistant fire chief for the City of Watertown. This was the last place he worked in a firefighting job where he actively fought fires. Although he last worked for the City of Watertown in 2009, he subsequently worked until 2012 as the fire chief for a city in Illinois. The applicant developed a rare cancer of the bile ducts in his liver, called cholangiocarcinoma. He was diagnosed in April 2012, and he died in December 2012, at the age of 62. The applicant alleges, through his widow, that his work exposure to chemicals as a firefighter was at least a material contributory causative factor in the onset or progression of the cancer, and that he is entitled to

²³ The commission consulted with the administrative law judge regarding her demeanor impressions of the witnesses who testified. See *Braun v. Indus. Comm'n*, 36 Wis. 2d 48, 57, 153 N.W.2d 81 (1967); *Transamerica Ins. Co. v. DILHR*, 54 Wis. 2d 272, 282, 195 N.W.2d 656 (1972); *Briggs & Stratton Corp. v. DILHR*, 43 Wis. 2d 398, 407, 168 N.W.2d 817 (1969); and *Flippin v. Turlock*, 24 Wis. 2d 49, 55, 127 N.W.2d 822 (1964). The administrative law judge indicated that she found Mr. Biefeld to be very matter of fact and to have testified factually and truthfully. She found that he was able to provide significant factual/statistical information and was very credible. However, the administrative law judge found that Mrs. Quint had the propensity to portray herself as a "medical expert" with no training. She was not qualified to provide a causation opinion, but she attempted to provide testimony linking firefighting activities to the applicant's rare cancer. Based on these representations, the administrative law judge did not find Mrs. Quint credible. She determined that the medical experts could not link the cancer to something specific, that it would be speculative for a lay person with no credentials to provide this testimony, and that Mrs. Quint's opinion could not meet the applicant's burden of proof. While Mrs. Quint could present herself as an advocate for firefighters with her volunteer activities, the administrative law judge concluded that she does not have a credential that could be relied upon as the basis for an award. The commission has considered the response and has also found that Mr. Biefeld was credible regarding the firefighting activities and the toxins to which the firefighters were exposed. The commission also agrees that Mrs. Quint was not competent to provide a medical causation opinion. The commission has not relied upon Mrs. Quint's testimony in that regard. The commission did find Mrs. Quint credible regarding her personal, firsthand observations of the applicant's firefighting activities and job duties, which were corroborated by Mr. Biefeld and the position description. The commission's decision to reverse ultimately is based on the credible medical causation opinion of Dr. Cochran and the medical literature on which she relied. See *Hermax Carpet Marts v. LIRC*, 220 Wis. 2d 611, 617-618, 583 N.W.2d 662 (Ct. App. 1998).

duty disability benefits under Wis. Stat. § 40.65. The respondent denies the claim and that the applicant's cancer was caused by his work exposure.²⁴ The applicant is not entitled to the statutory presumption for duty-related cancer in firefighters found in Wis. Stat. § 891.455(2) because, although he was a firefighter for 35 years, he was not a firefighter *in Wisconsin* for at least 10 years, as required by the statute for the presumption to apply.²⁵ (He was a firefighter in Wisconsin for only 7 of the 35 years.) The administrative law judge found the applicant's widow failed to prove that the cancer was due to his occupational exposure at the City of Watertown and dismissed the hearing application. Mrs. Quint then filed a timely petition for commission review.

Analysis

The issue is whether the applicant's work exposure as a firefighter was at least a material contributory causative factor in the onset or progression of his rare bile duct cancer (cholangiocarcinoma), from which he died, such that his widow is entitled to duty disability benefits under Wis. Stat. § 40.65. The applicant has the burden of proving beyond a legitimate doubt all the facts necessary to establish a claim for compensation.²⁶ The commission must deny compensation if it has a legitimate doubt regarding the facts necessary to establish a claim, but not every doubt is automatically legitimate or sufficient to deny compensation.²⁷ Legitimate doubt must arise from contradictions and inconsistencies in the evidence, not simply from intuition.²⁸

²⁴ The respondent formally denied the applicant's claim for duty disability benefits with the Department of Employee Trust Funds in 2018. *See* Ex. 4. The parties reached a compromise agreement regarding the worker's compensation claim. *See* Ex. 2.

²⁵ Wisconsin Stat. § 891.455(2), initially adopted in 1997 Wis. Act 173, provides:

In any proceeding involving an application by a state, county, or municipal fire fighter or his or her beneficiary for disability or death benefits under s. 40.65 (2) or any pension or retirement system applicable to fire fighters, where at the time of death or filing of application for disability benefits the deceased or disabled fire fighter had served a total of 10 years as a state, county, or municipal fire fighter and a qualifying medical examination given prior to the time of his or her becoming a state, county, or municipal fire fighter showed no evidence of cancer, and where the disability or death is found to be caused by cancer, such finding shall be presumptive evidence that the cancer was caused by such employment.

The statute is drafted such that the definition of who is a state, county, or municipal fire fighter means a firefighter covered under the Wisconsin statutes. Wis. Stat. § 891.455(1). According to the Joint Survey Committee on Retirement Systems Report on Senate Bill 329, which ultimately became Wis. Stat. § 891.455, the purpose of the bill was to provide a similar presumption of occupational disability and eligibility under Wis. Stat. § 40.65 to firefighters with 10 years of service who contract cancer of a type other than that already covered under the existing statute for heart and lung provisions. Documents of the committee and testimony presented to the committee are available on the Legislature's website:

https://docs.legis.wisconsin.gov/1997/related/public_hearing_records/ac_government_operations/bills_resolutions/97hr_ac_sb0329_pt01.pdf;

https://docs.legis.wisconsin.gov/1997/related/public_hearing_records/ac_government_operations/bills_resolutions/97hr_ac_sb0329_pt02.pdf.

²⁶ *Leist v. LIRC*, 183 Wis. 2d 450, 457, 515 N.W.2d 268 (1994); *Erickson v. DILHR*, 49 Wis. 2d 114, 118, 181 N.W.2d 495 (1970).

²⁷ *Erickson*, *supra*, at 119; *Leist*, *supra*, at 457.

²⁸ *Erickson*, *supra*; *Richardson v. Indus. Comm'n*, 1 Wis. 2d 393, 396-97, 84 N.W.2d 98 (1957).

The Parties' Arguments

Mrs. Quint argues that the workplace exposure was substantial and served as a material contributory causative factor in the onset or progression of the applicant's cancer and subsequent death. Under Wisconsin's broad standard for occupational diseases, the workplace exposure of the last employer need not be the main or only factor in the injury; compensability should be found if there was a material factor in the development of the disease. And that exposure can be minimal. Though it is not directly applicable to the applicant's case because he did not work a full 10 years in Wisconsin, Mrs. Quint argues that the presumption Wis. Stat. § 891.455(2), which provides that a full-time firefighter with no history of cancer and at least 10 years of service in Wisconsin is entitled to an evidentiary presumption that the cancer is occupationally-related, recognizes that firefighters are at a far greater risk of developing cancer than other professions. The applicant's career did span decades (35 years), just not 10 years in Wisconsin, so he does not technically meet the statutory requirements of the presumption. However, his last years of appreciable exposure did occur in Watertown, and this included some of his most significant occupational exposure; and he did indeed develop a kind of cancer that would have been covered under the statute.

Mrs. Quint points out that during the applicant's tenure at the employer, the department only provided one set of firefighting gear to the members. Pursuant to Mr. Biefeld's testimony, this policy was changed because contaminants build up over time. Mr. Biefeld also testified that the firefighters were exposed to byproducts of fires more times than he could count. In addition, the applicant served as incident commander and overall incident commander at the historic Watertown Tire Fire in 2005 over six days. The fire was so large that numerous federal, state, and local government agencies responded. When the applicant returned from this fire, his skin was blackened and covered in soot. Since the applicant is deceased and unable to testify, Mrs. Quint argues that her testimony from her own firsthand experience should be credited. Also, Mr. Biefeld was able to confirm that the applicant spent 120 hours on the historic Tire Fire, so it is clear that the applicant's duties were not purely administrative. In addition, in the report on the fire, the U.S. Department of Health and Human Services concluded that particulate levels were observed near the fire scene that exceeded occupational exposure guidelines, resulting in potentially high exposures to firefighters and others present near the scene. The testimony also showed that the applicant had occupational exposure to volatile compounds throughout his entire career with Watertown. He had no history of smoking, drinking, or family history of his kind of cancer, yet he developed a form of digestive tract cancer a few years after leaving Watertown. However, in the course of his duties, according to Dr. Cochran, he was regularly exposed to carcinogens, including but not limited to carbon monoxide, soot, benzene, phosgene gas, particulate matter, asbestos, formaldehyde, polycyclic aromatic hydrocarbons (PA), diesel fuel fumes, and exhaust.

Mrs. Quint also argues that the medical reports prove that the applicant's work exposure was a material contributory causative factor in the onset or progression of his cancer. The commission should not credit Dr. Blake, according to Mrs. Quint, because when setting aside the document headings and interrogative section, his report is

merely two pages of history and scant analysis on causation. Without any discussion of the applicant's significant exposure over decades of firefighting, Dr. Blake swiftly concludes that because the medical literature he reviewed states the "exact cause" is unknown, therefore, it cannot be work-related – even in part. By contrast, according to Mrs. Quint, Dr. Cochran drafted a 20-page report discussing the applicant's work history and exposure, medical history, the relevant literature, and her causation analysis. She argues that this is far more credible and the commission should credit this and find that the occupational exposure as outlined in the records and supported by the medical studies played a causal role in the applicant's cancer. Dr. Cochran reviewed the entirety of the kinds of exposures firefighters face in the line of duty based on scientific literature. In addition to Dr. Cochran, Dr. Lanzotti, who has extensive experience in oncology, also opined that the applicant's exposure was a material contributory causative factor in the onset or progression of his cancer. Dr. Lanzotti was the applicant's treating oncologist and personally knew of the applicant's extensive toxic work exposure. Because he had a hands-on experience treating the applicant, Mrs. Quint argues that he was in a credible position to render an opinion as to causation.

Mrs. Quint further argues that the administrative law judge erred by holding the applicant to a higher burden of proof and demanding verified testing results of chemical exposure that would support a greater risk of developing his kind of digestive system cancer. The law does not require applicants to prove industrial hygiene testing of their work environments in order to successfully bring an occupational disease claim. Courts look at industrial testing only if they are actually available. Such an exacting standard would be impossible to carry out in the real world because firefighters regularly face active dangers and are exposed to all sorts of volatile synthetic and organic compounds while handling fires, chemical spills, medical emergencies, etc. It is not reasonable to expect them to hire companies to test these uncontrolled work environments in the event they may develop an occupational disease later in life. Mrs. Quint argues that she has met her burden of proof by showing credible medical support from treating physicians or expert witnesses, testimony at the hearing, and the records in evidence.

In response to the respondent's assertion that Dr. Cochran did not review the applicant's medical records, Mrs. Quint argues that her report specifically states that she reviewed his medical records and some of his employment records. Though she later referred to not having "his actual records," the applicant argues that this was in reference to her review of the report by Dr. Blake, who referenced reviewing medical records, and which records those were, she did not have access to. It is not logical, according to Mrs. Quint, that Dr. Cochran would first say she had reviewed the records and then immediately recant. Neither Dr. Cochran, nor Dr. Blake, personally examined the applicant, so that is not a reason not to credit Dr. Cochran. Dr. Lanzotti *did* treat the applicant, and he opined the work exposure was a material factor in the applicant's cancer.

The respondent responds and asserts that Dr. Blake is the only medical expert who reviewed any medical records relating to the applicant, and he opined that the applicant's cancer and death were not work-related. The respondent argues that the

commission should not credit the applicant's expert, Dr. Cochran, because her opinions were based on erroneous information. It argues, for instance, that Dr. Cochran never reviewed any of his medical records and did not examine the applicant. The respondent also argues that Dr. Cochran misunderstood that the applicant spent his entire career as a firefighter, when in reality, he spent the last 16 years of his working life employed as an administrator with several municipal fire departments, with very limited field work.

Dr. Cochran also erroneously thought the applicant retired effective with his voluntary quitting of his employment with the employer, and that he had been retired for two years at the time of his first symptoms of cancer, but that was not the case. He never retired; rather, he was subsequently employed as the fire chief in Lichtfield. Dr. Cochran also failed to acknowledge that the applicant's mother and brother died of cancer. The applicant's employment was primarily administrative, with him spending only 5% to 7½% of his working time in the field. The respondent points out that Dr. Cochran agreed with Dr. Blake that the medical literature fails to provide any proof of causation for any individual toxin or chemical in cases of the kind of cancer the applicant had. She also admitted that there was a paucity of data regarding cholangiocarcinoma because of the lack of sufficient subjects and comparison to study against a baseline population; and she admitted there are no studies that correlate firefighting exposure with cholangiocarcinoma using standard mortality ratio, odds ratio, and relative risk in the medical literature.

The commission should not credit Ms. Bolstad-Johnson, according to the respondent, because her report is inadmissible pursuant to Wis. Admin. Code § ETF 52.02(4) and should be excluded from the record. She is a non-physician and did not appear to testify. The report purports to provide an opinion as to cause of death, but she is not competent to do so. The commission can only consider two opinions, according to the respondent, Dr. Blake, and Dr. Cochran. Dr. Cochran's report is based on false premises, misunderstandings of basic facts, and was without review of a single medical record. Based on the facts, and Dr. Blake's opinion, the respondent argues that the applicant has failed to meet the burden of proof in this case and that the commission should affirm the administrative law judge's dismissal of the hearing application.

Was the applicant's work exposure at least a material contributory causative factor in the onset or progression of the applicant's cholangiocarcinoma?

Under the occupational disease theory of causation, employment exposure need not be the sole cause or the main factor in the applicant's condition.²⁹ It is sufficient to show that work exposure was a material factor in the development or progress of the disabling disease.³⁰ There is also no legal minimum period of time necessary to have causation by occupational disease.³¹ While there is no specific time of exposure required for an occupational disease injury, and the commission has found that exposure of a

²⁹ *City of Superior v. DILHR*, 84 Wis. 2d 663, 668 n.2, 267 N.W.2d 637 (1978); *Universal Foundry Co. v. DILHR*, 82 Wis. 2d 479, 487-88 n.5, 263 N.W.2d 172 (1978).

³⁰ *Id.*; *Milwaukee Malleable & Grey Iron Works v. Indus. Comm'n*, 239 Wis. 610, 615-16, 2 N.W.2d 197 (1942).

³¹ See, e.g., *Skelly v. Kmart Corp.*, WC Claim No. 2006-017104 (LIRC May 29, 2008).

few hours on a single day has been an occupational exposure injury,³² the court of appeals has stated that “The law is well-settled that an occupational disease cannot result from a single incident.”³³ Several commission decisions, and at least one unpublished court case, *Cnty. Concrete Corp. v. LIRC, & Gumieny*,³⁴ recognize that an occupational disease injury may result from only one day’s work exposure, or from only one shift’s work exposure.³⁵

Based on the totality of the evidence in this case, the commission finds that the applicant has met his burden of proof. The applicant may not be able to point to the exact chemical that contributed to the onset of his cholangiocarcinoma, but that is not required. Nor is it required that the applicant provide specific testing results from the various fires to which he was exposed over 35 years to show that he was exposed to a particular chemical that caused his cancer. That is nowhere required in the statutes, and indeed would likely be impossible. As the commission has noted previously, for example, doctors know that cigarette smoking can cause bladder cancer, even if they do not know which particular substances in the tobacco smoke cause the cancer.³⁶ In this case, the applicant needs to prove that he was exposed to cancer-causing chemicals and provide a supporting medical opinion regarding causation for that exposure. The applicant has done so, and the commission has no legitimate doubts that the applicant’s work exposure was at least a material contributory causative factor in the onset or progression of his cancer.

First, the applicant had no history of smoking, drinking, or family history of the kind of cancer he developed. He had no known risk factors for the cholangiocarcinoma. There is no dispute that this is the cancer that caused his death.

Second, the applicant proved that he worked as a firefighter for several decades. He worked for the employer in Wisconsin for 7 years. Mrs. Quint also testified to the length of the applicant’s firefighting service, and Mr. Biefeld confirmed that the applicant worked as a firefighter with the employer, including 120 hours on the Watertown Tire Fire. If all of the applicant’s firefighting service had been done in Wisconsin, or even three more of his years of service, he would be entitled to the statutory presumption that his cancer was caused by his work exposure. Though the statute does not apply to prompt the presumption in this case, it does show the Legislature’s recognition that

³² *Gumieny v. Cnty. Concrete Corp. & Zurich American Ins. Co.*, WC Claim No. 2004-017501 (LIRC July 11, 2006), *aff’d sub nom.*, *Cnty. Concrete Corp v. LIRC & Gumieny*, unpublished per curiam (WI App. Oct. 15, 2008)(petition for supreme court review denied).

³³ *Kwaterski v. LIRC*, 158 Wis. 2d 112, 119, 462 N.W. 2d 534 (Ct. App. 1990).

³⁴ *Concrete Corp v. LIRC & Gumieny*, unpublished per curiam (WI App. Oct. 15, 2008)(petition for supreme court review denied).

³⁵ See, *Quinones v. Anew Healthcare Serv. & Hastings Mut. Ins. Co.*, WC Claim No. 2013-010074 (LIRC March 30, 2015); *Delaney v. Waupaca Foundry & Employers Ins. of Wausau*, WC Claim No. 2000-030373 (LIRC Sept. 29, 2003); *Van Vonderen v. Miller Elec. Mfg. Co.*, WC Claim No. 2000-061234 (LIRC Aug. 14, 2002); *Gumieny v. Cnty. Concrete Corp. & Zurich American Ins. Co.*, WC Claim No. 2004-017501 (LIRC July 11, 2006), *aff’d sub nom.*, *Cnty. Concrete Corp v. LIRC & Gumieny*, unpublished per curiam (WI App. Oct. 15, 2008)(petition for supreme court review denied); and *Meyers v. Fort James & James River Dixie North*, WC Claim No. 1998-002628 (LIRC Dec. 8, 1999).

³⁶ See, *Clark v. PPG Indus., Inc.*, *supra*.

firefighters are exposed to multiple carcinogens in their work that cause cancers, including digestive cancers like the applicant developed.³⁷

The applicant also proved that he had significant exposure to firefighting, though he also had administrative responsibilities. Mr. Biefeld testified that the Watertown Fire Department had 23 to 24 structural fires per year. The administrative law judge found that the average number of fire calls per year would have been 23 to 24, and of these, 5% to 7½% would have involved structural fires, and the rest of the calls would be EMS calls and false alarms. However, this finding was incorrect. Mr. Biefeld actually testified that they had 23 to 24 *structural fires* per year; he testified that 20% of their calls were fire calls, and 5% to 7½% of their calls were for structural fires. In other words, while most of their calls were not fire calls, they still had 23 to 24 structural fires per year. Mr. Biefeld also testified that structural fires were more significant than other calls and could take up to 5 hours on the scene. This means that the applicant would have been exposed to fighting structural fires and being on the scenes of structural fires for about 100 hours per year while employed with the employer. The applicant was also responsible for training, and one of his evaluations indicated that he had significantly increased training classes, drills, and training hours over 100%.

The Watertown Tire Fire was a major fire event, which even Mr. Biefeld testified was significant because of its length and magnitude. The DHHS report on the fire indicated that the smoke rose over 100' and was visible for 30 miles and observed on satellite imagery. There is no doubt it was a huge fire, burning tires over a 5-to-6-acre area. The photos of the fire show huge black plumes of smoke and firefighters not wearing respiratory protection. The applicant was at this fire for at least 5 days, and he came home from this fire covered in soot and with his face black. Based on the average number of structural fires and the extensive exposure at the Watertown Tire Fire, the applicant proved that he spent significant time fighting fires while working for the employer.

Third, the applicant also proved that he was exposed to carcinogenic chemicals while fighting fires. The background information from the industrial hygienist indicated that smoke contains carbon monoxide, hydrogen cyanide, poly nuclear aromatic hydrocarbons (PAHs), formaldehyde, other aldehydes, asbestos, metals, isocyanates, respirable particulates, nitrogen dioxide, sulfur dioxide, etc.; and the Watertown Tire Fire was representative of a significant acute exposure to numerous carcinogens. The applicant was clearly exposed to smoke. The DHHS report on the Watertown Tire Fire also concluded that the fire posed a public health hazard. The report noted that the

³⁷ The Wisconsin Legislature has already considered that "Research on the exposure of firefighters to carcinogenic agents in the course of their duties has found damaging levels of numerous known and suspected carcinogen present at fires and in firehouses as well. Chief among these are benzene and other aromatic hydrocarbons, asbestos, formaldehyde, chemicals present in diesel exhaust, PCB's, styrene, methylene chloride, and other organic chemicals." The Report also noted that "Many harmful chemicals absorb through the skin as well as by inhalation, so that it may be impossible for a firefighter to avoid receiving harmful doses of carcinogens. In fact, diesel exhaust from firetrucks present in the air at firehouses has been determined to be a major cause of increased cancer risk for firefighters." Appendix to 1997 Senate Bill 329, Report of Joint Survey Committee on Retirement Systems, LRB-1538/3.

firefighters in particular were exposed to high levels of fine and ultrafine particulate at various times during the fire. When the smoke plume was near the ground, the particulate levels often exceeded recommended exposure limits for occupational environments. Exposure also occurred to gases such as carbon monoxide and benzene; and PAHs and metals had been detected in the soil and would require remediation. Mr. Biefeld also confirmed that the department had changed some of its practices to provide a second set of turnout gear because contaminants build up over time. This was to reduce the exposure of the firefighters to those harmful contaminants. He also testified that there are a lot of petroleum-based products that off-gas, and they had recently been concerned by hydrogen cyanide. He also indicated that they are exposed to dangerous substances, including carbon monoxide and byproducts of the materials in buildings and their contents. Even Dr. Blake admitted that the applicant was exposed to various chemicals and toxins in his work as a firefighter, including benzene and toluene at the Watertown Tire Fire.

In addition, the various studies and reports cited by Dr. Cochran showed that firefighters are exposed to numerous carcinogens. One of the medical studies cited by Dr. Cochran showed that cumulative exposures to firefighting instructors to toxic contaminants generated from live-fire training potentially far exceeded firefighter exposures arising from occupational fires, and that firefighting instructor exposures to PAHs during a single live-fire training evaluation are comparable with exposures occurring in industrial settings over a full shift. The applicant's job required training for the department's firefighters, and this study would suggest that he was exposed to even higher levels of PAHs during training.

The other medical literature cited by Dr. Cochran supports the premise that firefighters are exposed to toxic chemicals and carcinogens in their work. This is understandable considering that fires of structures would include burning wood, paints, adhesives, floor coverings, electrical appliances, plastics, metals, etc. The evidence indicates that exposures at a fire scene including but not limited to asbestos, benzene, PAHs, formaldehyde, diesel fumes, phosgene gas, fine particulate matter, smoke, and arsenic, all of which are known or strongly suspected to be carcinogenic. Burning building material also includes exposure to asbestos and lead. Firefighters are also exposed to diesel exhaust, and contaminants in their clothing. The literature also notes particular links to increases in digestive cancers, and a known carcinogen excreted through the bile ducts. Fires include mixtures of these chemicals, and there can be cumulative exposures to these toxic agents. This medical literature is persuasive evidence that firefighters are routinely exposed to complex and dynamic mixtures of chemical substances and numerous toxic and carcinogenic chemicals in smoke and building debris while doing their firefighting work.

Fourth, the applicant has provided a credible medical opinion that his work exposure was at least a material contributory causative factor in the onset or progression of his cancer with the credible opinion of Dr. Cochran. Dr. Cochran correctly understood that the applicant participated in fire suppression with the known exposure of multiple carcinogens and presumed carcinogenic agents, including carbon monoxide, soot, benzene, phosgene gas, particulate matter, asbestos, formaldehyde, PAHs, diesel/fuel,

and exhaust materials. Though she opined that the etiology of cholangiocarcinoma was poorly understood, nevertheless, Dr. Cochran noted that not all cancers have defined exact causative agents, and she was able to do a causation analysis, weighing the entire spectrum of medical literature and data. She noted that plasticizers had been found in the protective clothing of firefighters, and that the applicant's equipment was contaminated by PAH, classified as a class 1 carcinogen. Based on the medical literature, she reasoned that PAH exposure may cause hepatotoxicity and inflammation in the liver. The mechanism of damage by the carcinogen would be the carcinoma at the site of the inflammation. Since PAH is metabolized in the liver and excreted in the bile and the urine, this explains the carcinogenesis of the applicant's cancer in the bile ducts. She noted that no other factors would cause this cancer. Therefore, she opined to a reasonable degree of medical certainty, that the applicant's cholangiocarcinoma was causally related to his exposures to multiple class I carcinogenic agents and his career as a firefighter. The carcinogenic agents included PAHs, asbestos, formaldehyde, benzene, and diesel fumes. Given her well-reasoned analysis supported by the medical literature, the commission finds her opinion to be the most credible.

Though the respondent argues that Dr. Cochran's opinion should not be credited because she did not personally review the medical records, and she misunderstood that the applicant had retired in 2010, the commission does not find that these raise significant concerns with her opinion. Dr. Cochran stated clearly that she had reviewed the medical records, but then later made a statement that could be interpreted to mean that she had not. In any event, she reviewed Dr. Blake's summary of the medical records, and no doctor disputes that the applicant had cholangiocarcinoma, that he was diagnosed in April 2012, and that he died of this cancer in December 2012. The details of his specific treatments are not at issue. There is nothing to suggest that any other diagnosis would be reached based on a more detailed review of the medical records. Similarly, the misstatement that the applicant had retired in 2010 is not particularly relevant. The applicant had stopped working for the employer in 2009, but his separation agreement was not signed until 2010. The letter of reference attached to the separation agreement indicated that the applicant worked for the employer until August 2010. It is understandable why the applicant may have been thought to have worked for the employer until 2010. The fact that the applicant did not in fact retire but went on to work as a fire chief is not relevant to the issues in this case because he did not go on to have additional work exposure fighting fires. The effect of his leaving the employer was the same for his firefighting exposure purposes.

The commission does not find Dr. Blake's opinion to be as credible as that of Dr. Cochran. Though Dr. Blake stated that the exact cause of cholangiocarcinoma is unknown and that the medical literature fails to provide proof of causation for any *individual* toxin or chemical in cases of cholangiocarcinoma, he did not discuss the applicant's significant exposure over decades of firefighting or the exposure to combinations of chemicals and toxins.

The commission finds that the most credible conclusion drawn from the evidence is that the applicant's extensive, relevant work exposure exposed him to numerous

carcinogens, individually and combined, and that it is likely to a reasonable degree of medical certainty that this exposure was at least a material contributory causative factor in the onset or progression of his cancer. This is not speculation, but it is based on the facts of the applicant's exposure and the credible medical opinion of Dr. Cochran. It is based on the well-recognized exposure of firefighters to carcinogenic substances in their work exposure, as supported by the legislative recognition of a presumption in some cases, the applicant's specific exposure over several decades, the medical literature finding increased risks to develop cancer from the exposures the applicant had, and the credible medical causation opinion of Dr. Cochran that the applicant's work was at least a material contributory causative factor in the onset or progression of his cancer. Accordingly, the administrative law judge's decision is reversed and the Department of Employee Trust Funds shall compute and pay the benefits due for duty disability benefits consistent with the provisions of Wis. Stat. § 40.65.

cc: Atty. Brandon G. Jubelirer
Atty. Troy D. Thompson
Atty. Daniel P. Hayes, ETF