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REPORT OF CHRISTOPHER DEPASQUALE, MPH, CIH

RE: Huntington Eldridge, Jr.

July 15, 2020

At the request of Cooney & Conway, I have reviewed case specific information regarding Mr. Huntington Eldridge, Jr., and prepared this report concerning his exposure to asbestos-containing materials (ACM). I am a Senior Industrial Hygienist with Compass Environmental, Inc. located at 1751 McCollum Parkway, Kennesaw, GA 30144. I am certified in the comprehensive practice of industrial hygiene by the American Board of Industrial Hygiene (Certificate No. 8361 CP). Industrial hygiene is the field of identification, evaluation and control of occupational and environmental health hazards. I have practiced industrial hygiene for over twenty-two years. In the field of asbestos management and control, I have conducted asbestos sampling in over one hundred buildings, including commercial office buildings, hospitals, industrial plants, and government facilities. I have performed monitoring on individuals and at facilities to evaluate potential exposures to asbestos and analyzed such samples over the course of my career. Furthermore, I have participated in sampling to evaluate historical exposures to asbestos. I have researched the published literature, and unpublished reports and studies, to understand the historical exposures workers experienced. I have read over one thousand depositions given by workers that have worked with or around asbestos-containing products to learn the work practices they followed. These have included workers in asbestos product manufacturing, construction trades, building maintenance, and others in various settings. I am also familiar with the standards, guidelines and regulations applicable to workers' exposure to asbestos. My curriculum vita is attached providing specific details of my qualifications, experience, and publications. Compass Environmental, Inc. invoices $325 per hour for my time plus any necessary expenses.

The case specific materials provided and relied upon in developing my opinions were the following:

1. Deposition of William Putze, August 22, 2019;
2. Deposition of Robert Webbe, March 18, 2020;
3. Deposition of Michael Glavin, May 7, 2020;
4. Deposition of Ray Anderson July 18-19, 2018;
5. Plaintiff's Answers to Interrogatories;

6. MVA Report: Examination of Remington Shotgun Shell Basewads for Asbestos;
7. MVA Report: Investigation of Asbestos Fiber Release During Discharge of Remington Shotgun Shells;
8. Dupont/Remington Documents;
    a. 1971_01_19 Memo from Remington to Dupont's Haskell Lab regarding Friable Projectile
    b. 1971_02_17 Memo from Haskell Lab to Remington regarding Asbestos in the Projectile
    c. 1973_12_10 Remington Air Sampling
    d. 1977_01_20 Remington Air Sampling
    e. 1977_07_13 Remington Air Sampling
    f. 1978_03_28 Remington Air Sampling
    g. 1978_07_28 Remington Air Sampling
    h. 1979_04_29 Asbestos Fibers – Quantification and Qualification (PCM vs. TEM)
    i. 1979_06_01 Minutes of Special Meeting to Discuss Asbestos Handling
    j. 1979_06_29 Remington Air Sampling
    k. 1980_03_20 Remington Air Sampling
    l. 1980_10_22 Remington IH Data Form
    m. 1980_11_07 Media Statement regarding Asbestos Basewads and Hazard to Shooters
    n. 1981_01_26 Remington Air Sampling
    o. 1981_08_31 Travelers Insurance Analysis of Remington Air Sampling
    p. 1981_09_18 Remington Air Sampling
    q. 1981_09_24 Remington Air Sampling
    r. 1982_01_21 Remington Air Sampling
9. Patent Filings;
    a. US 3,270,671 (Cartridge Wad and Process for Manufacture Thereof)
    b. US 3,978,794 (Base Wad for Shotshells)
10. Medical Records

Work History and Practices

Outlined below is a summary of my understanding of Mr. Huntington Eldridge, Jr.'s work history from which I have formed opinions. Should my understanding be incorrect or be augmented, my opinions may also change.

Mr. Huntington Eldridge Jr. Was born in Lake Forest, Illinois on November 1, 1950. Mr. Eldridge learned he was diagnosed with mesothelioma in December 2015, and subsequently died on June 10, 2016. Mr. Eldridge did not provide deposition testimony prior to his death.

Mr. Eldridge essentially worked in the investment banking industry until circa 1982, when he began working on behalf of Ducks Unlimited., Inc. He reportedly worked for Ducks Unlimited raising money for their conservation efforts. Mr. Eldridge's work for Ducks Unlimited was reportedly the culmination of a lifelong enjoyment of hunting and resulted in him hunting throughout the midwestern United States.

Friends who hunted with Mr. Eldridge provided deposition testimony about their experiences. Mr. William Putze, Mr. Michael Glavin, and Mr. Robert Webbe hunted with Mr. Eldridge beginning in the mid to late 1970's. According to the testimony of Mr. Putze, Mr. Eldridge grew up hunting, and he believed he began learning how to fire a gun and hunt when he was five to seven years old.

Mr. Eldridge and friends primarily hunted migratory birds such as ducks, geese, and doves. It was not uncommon for Mr. Eldridge with a friend or two to hunt approximately forty-five minutes outside of Chicago at a farm owned by Mr. Putze's family. They would even hunt on weekdays rising early in the morning, driving to the farm, hunting for one and a half to three hours, and then returning in time to go to work. On weekends they would hunt for longer periods of time, usually six and a half hours. Mr. Putze estimated that he hunted with Mr. Eldridge ninety to one hundred times a season. He also noted that he knew Mr. Eldridge also went hunting without him.

Mr. Eldridge's friends described primarily hunting out of a duck blind, which provided both camouflage as well as shelter from the elements. Mr. Putze indicated for duck hunting it was preferable to have more wind when hunting, but Mr. Putze also indicated there were many days

where they hunted, and it was not windy. On days when they could not find birds to shoot at, they would bring what Mr. Putze described as a hand sling to launch clay pigeons that they could practice shooting. Estimates of how many shells they would shoot on a day of hunting ranged from at least ten to seventy-five per person. The high number was attributed to Mr. Eldridge when they would shoot clay pigeons.

Mr. Putze recalled he went trap shooting around twelve times per year and believed Mr. Eldridge went more frequently than he had. He estimated when they went trap shooting, they would go through about seventy-five to one hundred shells.

There was no information from his friends regarding Mr. Eldridge performing renovation or remodel work. Mr. Putze indicated That Mr. Eldridge was not a handyman. Furthermore, there was no suggestion that, Mr. Eldridge performed any automobile maintenance. Mr. Webbe indicated he would bet everything he owned Mr. Eldridge never did any work on a car.

Asbestos Exposures

Mr. Eldridge had exposure to asbestos when he shot shotgun shells with asbestos-containing basewads and was also likely exposed when others shot these shells in his presence. Exposures to asbestos are expressed as a concentration of asbestos (either as fibers or structures) in air. The units are either fibers per cubic centimeter of air (f/cc) or structures per cubic centimeter of air (s/cc).

Asbestos was used for the manufacture of basewads for shotgun shells. The asbestos would be mixed with wood flour and wax, and then pressed into basewads. In a 1978 Environmental Protection Agency (EPA) report the percent of asbestos in basewads was reported as thirty-six percent.[1] Remington Arms Company Patent # 3,270,671 indicated a preferred composition of the basewad having forty percent asbestos, however the patent indicated that acceptable basewads for most general uses can be produced by varying the asbestos not substantially less than 30% and not substantially more than 60%.[2] At the time of the 1978 EPA report, monitoring data for asbestos

[1] *Chemical Market Input/ Output Analysis of Selected Chemical Substances to Assess Sources of Environmental Contamination: Task III. Asbestos;* Prepared for Office of Toxic Substances, U.S. Environmental Protection Agency, Washington D.C., Report No. EPA 560/6-78-005, August 1978.
[2] United States Patent Office, Patent # 3,270,671, Patented Sept. 6, 1966.

fiber release when a shot gun shell with asbestos basewads was fired from a gun was not available. However, the report did note that it may be possible that free fibers are released when a shotgun is discharged with an asbestos-containing base wad (as part of the shell). A 1978 Consumer Product Safety Commission (CPSC) report described ammunition shell wadding was used to diminish shell distortion (thus giving more potential reloads to the shell). This same report indicated the scenario for fiber release from this use of asbestos in ammunition shell wadding would be, "Should the wadding disintegrate upon discharge".[3]

Numerous Remington Arms Company, Inc. internal documents (previously noted among materials provided) indicate that they performed monitoring for asbestos to evaluate the exposures of their employees during the manufacture of asbestos containing basewads, and the ammunition that utilized those basewads. However, sampling was performed on October 22, 1980, on a ballistics tester named Ellis Burns, and reported to R.H. Gruss by D.A. Huesch on January 26, 1981. An industrial hygiene data form provided for this sampling event indicates the sampling was performed for 442 minutes, of which approximately 360 minutes was spent shooting. It is an assumption that because the monitoring was performed to evaluate asbestos exposures that at least some of the ammunition used contained asbestos. However, there is no documentation of what ammunition was fired or with what frequency, nor does it indicate what percentage of the ammunition may have contained asbestos.

The sampling of Mr. Burns is reported to have taken place at Building 776 (Barnum Ave.) in Bridgeport, Connecticut. There is no further indication of the setting for the shooting on the industrial hygiene data form, but the deposition of Raymond Anderson indicated that at the Remington facility they had firing ranges, which were basically concrete tunnels.[4]

The industrial hygiene data form makes no mention if there is any ventilation present within the area where the shooting occurred. The potential that Remington required ventilation in their firing ranges to control potential lead exposures is suggested in a letter dated February 17, 1971 from James F. Morgan (commenting on behalf of Dr. John A. Zapp, Jr.) to M.W. Kordas, Jr. the Supervisor of Applied Research for the Remington Arms, Company, Inc. In the letter, the required

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[3] *Review of Asbestos Use In Consumer Products;* Submitted by: A.t. Kearney, Inc. to U.S. Consumer Product Safety Commission, April 1978.

[4] Deposition of Raymond Anderson, July 19, 2018, p291.

volumes of air needed to maintain the concentration of lead in the air below the Threshold Limit Value (TLV) when firing rimfire ammunition are suggested. To maintain the lead level below the TLV they suggest a ventilation rate ranging from 4,000 to 25,000 cubic feet of air per minute (CFM), with the ventilation rate dependent on how rapidly the ammunition is fired. Mr. Morgan notes that it is assumed, "....from the prior discussion that the firing is expected to be done within confined quarters such as a basement range."

In December 1975, the National Institute for Occupational Safety and Health put forth design considerations for controlling lead exposures in indoor firing ranges.[5] To control lead fumes, dust and gaseous combustion products in the range; they recommended a minimum ventilation rate of 50 feet per minute (fpm) should be maintained at the firing line with all of the air being exhausted at the bullet trap. However, they indicated that an optimum ventilation rate would be 75 fpm at the firing line with all air exhausted down range of the shooter. They recommended that supply air be introduced behind the firing line to guarantee an evenly distributed flow of air through the shooting positions.

The monitoring of Mr. Ellis Burns on October 22, 1980, measured exposure for asbestos by phase contrast microscopy of <0.004 f/cc, which was compared against the 8-hour time weighted average. Unfortunately, no short-term exposure sampling was performed, which may have provided information about a worst-case scenario for exposure. There is no documentation of what ventilation was or was not present during the monitoring of Mr. Burns, and furthermore there is no documentation regarding the types of ammunition he shot, nor the quantity of ammunition.

MVA Scientific Consultants conducted a study to evaluate potential exposures to asbestos when firing shotgun shells with asbestos basewads.[6] The study was performed in a negative air enclosure in the basement of a farmhouse in Farmington, Georgia. The enclosure was approximately 8 feet high, by 14 feet wide, by 15 feet long, or 1,680 cubic feet. The study area had a High Efficiency Particulate Air (HEPA) filtration device which was used to maintain air flow within the chamber and to filter the air as it was removed from the chamber before, during, and after the experiments. The

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[5] Anania, Thomas L., and Seta, Joseph A. *Lead exposure and design considerations for indoor firing ranges.* US Department of Health, Education, and Welfare, Public Health Service, Center for Disease Control, National Institute for Occupational Safety and Health, Division of Technical Services, 1975.

[6] *Report of Results: MVA13129: Investigation of Asbestos Fiber Release During Discharge of Remington Shotgun Shells*; Prepared for Cooney & Conway, March 2, 2020.

HEPA unit ran at a low flow rate (approximately 314 cubic feet per minute) during each of the experiments and a high flow rate (approximately 511 cubic feet per minute) between the experiments. Shells were fired using a Remington 1100, 12-gauge, semi-automatic shotgun mounted onto a Lead Sled DFT 2 from Caldwell Shooting Supplies and equipped with a manual trigger pull (string) to allow for remote firing of the shotgun from outside the chamber. The shotgun was positioned to fire into a custom-built target manufactured from ballistic rubber and steel to ensure that the shots were safely collected.

Four pumps were used to collect air samples at different locations within the study chamber. Air samples collected using Pump #01 were positioned within the breathing zone of a theoretical shooter (no shooter was present in the study chamber during firearm discharge), approximately 24" behind the shell ejector port. Air samples collected using Pump #02 were positioned 12" from the muzzle exhaust (end of the barrel) and 36" downrange from the shell ejector port. Air samples collected using Pump #03 were positioned approximately 12" from the shell ejector port. Air samples collected using Pump #04 were set-up to replicate the position of a bystander standing three feet from the shooter.

The first experiment performed (Test A) involved firing two shells from the Remington ShurShot style shell over a fifteen-minute period. One shell was discharged at the beginning of the air sampling period and a second approximately halfway into the experiment.

For Test B the shotgun was loaded with two shells from the Remington Magnum Express style shell. One shell was discharged at the beginning of the fifteen-minute sampling period and the second discharged approximately 11 minutes into the experiment after manually loading the next shell into the chamber.

For Test C the shotgun was loaded with two shells from the Remington Express style. One shell was discharged at the beginning of the fifteen-minute sampling period and the second discharged approximately halfway into the experiment.

For Test D the shotgun was loaded with eight shells from the Remington Express style. One shell was discharged at the beginning of the sampling period and at two-minute intervals thereafter over a sixteen-minute period.

NIOSH 7400 concentrations from the breathing zone of a shooter location (Pump #01) ranged from 0.11 to 0.23 fibers per cubic centimeter of air sampled (f/cc). Typically, a complementary analysis via TEM using NIOSH 7402 can be applied to establish an estimated asbestos f/cc concentration; however, in this study the NIOSH 7402 results were highly variable, with some samples indicating 0% asbestos and some indicating 100% asbestos. If the results of all air samples are combined, an average of 35% of the fibers identified by TEM were consistent with asbestos, thus resulting in an approximate breathing zone range of 0.04 to 0.08 asbestos f/cc.

The variability in the 7402 results was attributed to the presence of aluminum silicate fibers in the background air and non-fibrous gunshot residue (GSR). In addition, several asbestos fibers observed via TEM were not countable under NIOSH 7402 because they were below the minimum width cutoff of 0.25 micrometers. Because of these three issues, air samples from each experiment were also analyzed using either the EPA AHERA method or the ISO 10312 method, since both methods allow for a count of true asbestos fibers without a minimum width and without counting aluminum silicate fibers from the background air.

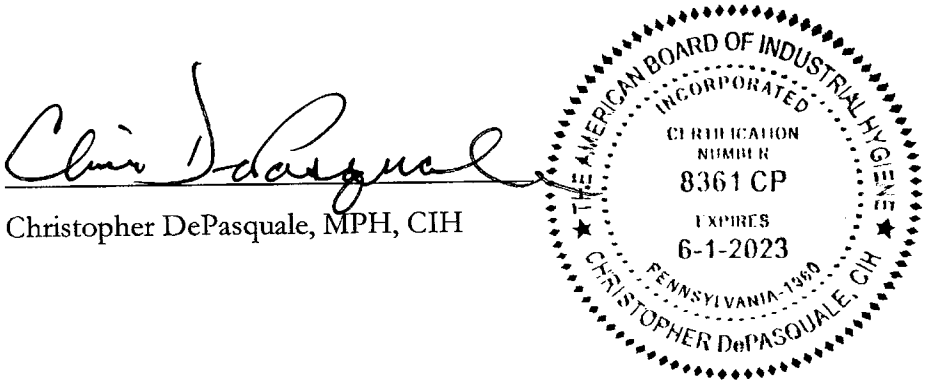
The MVA study concluded asbestos fibers from the basewad were aerosolized when the shell is discharged. Airborne asbestos fibers were detected in each of the four experiments conducted. When samples meant to represent the shooter location, were analyzed by TEM asbestos fiber structures present ranged from 1.0 to 1.9 structures per cubic centimeter (s/cc), after baseline correction. For a bystander, three feet from the shooter, the airborne asbestos concentration ranged from <0.25 to 1.4 s/cc (following baseline correction).

Mr. Putze described seeing smoke come out of the end of the barrel when they would shoot and indicated you could certainly smell smoke by the chamber. The fact that Mr. Putze could smell the smoke from the chamber suggests he was inhaling the gunshot residue, which would have also included any released asbestos from the shell's basewad as demonstrated by the MVA Study.

The weather conditions on any given day as well as the number of shells fired (and the frequency they were fired) would influence the potential exposure of Mr. Eldridge on a day of hunting. It is important to note that Mr. Eldridge's exposures to asbestos were not solely from his gun, but also those of his hunting partners shooting near him. On a windy day where ten shells were shot per person there may have been no significant increase above ambient levels of asbestos. However, at the other end of the spectrum a still day where seventy-five shots may have been fired per person, would likely have resulted in a significant increase in exposure for Mr. Eldridge. Taking into consideration the descriptions of Mr. Eldridge's hunting practices, the varying environmental conditions, and the documented release of asbestos in the MVA study; Mr. Eldridge would have at times had significant exposures to asbestos when hunting with shotgun shells utilizing asbestos-containing basewads.

In conclusion, it is my opinion that Mr. Eldridge suffered exposures to asbestos through his use of Remington shotgun shells containing asbestos basewads.

I hold the opinions expressed herein to a reasonable degree of scientific certainty.



Christopher DePasquale, MPH, CIH

July 15, 2020

Date