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SUPERIOR COURT OF CALIFORNIA

COUNTY OF SAN FRANCISCO – UNLIMITED JURISDICTION

IN RE: SAN FRANCISCO COUNTY COMPLEX ASBESTOS LITIGATION	Case No.: 828684 **DECLARATION OF PLAINTIFF'S EXPERT BARRY CASTLEMAN, Sc.,D. IN SUPPORT OF PLAINTIFF'S OPPOSITION TO DEFENDANT METALCLAD INSULATION CORPORATION'S MOTION FOR SUMMARY JUDGEMENT/ADJUDICATION**

I, BARRY CASTLEMAN, DECLARE AND STATE AS FOLLOWS:

BARCKGROUND AND QUALIFICATIONS

1. My name is Barry I. Castleman. I received a Bachelor's Degree in Chemical Engineering from Johns Hopkins University 1968. I have a Master's Degree in Environmental Engineering, which was mainly in areas related to air pollution control from Johns Hopkins University, 1972. I have a Doctor of Science Degree in Health Policy from Johns Hopkins School of Hygiene and Public Health, 1985.

2. My professional experience goes back over 30 years in the area of asbestos and other occupational and environmental health problems. My field is occupational and environmental health policy, which is a branch of Public Health, mainly oriented towards the recognition of risk factors and the prevention of disease from industrial activities.

3. The Doctoral degree was awarded for two years of course work, various examinations, and the writing of a doctoral dissertation. The course work was mainly in the areas of toxicology, epidemiology, biostatistics, physiology, and public health policy. These are the tools that are used to understand how the body works and can be damaged by toxic substances, how these effects can be identified by means of various studies of people, studies of animals experimentally exposed, etc.

4. My Doctoral thesis was, Asbestos: An Historical Case Study of Corporate Response to an Industrial Health Hazard, and is largely identical to a book published in 1984 by Prentice Hall Law and Business called Asbestos: Medical and Legal Aspects (now in its 5th Edition, 2004). The doctoral thesis is an historical review of the asbestos problem as a public health problem in society worldwide, but mainly in the United States. It encompasses a comprehensive review of medical literature of all kinds, as well as other literature available in libraries and published sources such as government publications, safety magazines, engineering journals, trade magazines, insurance publications, encyclopedias, popular magazines, and newspapers. The doctoral thesis also involved research based on unpublished government records. The government records included workers' compensation claims files where claims had been made by individuals alleging that they had asbestos-related diseases of the lungs, claims against various companies that were their employers, some of which companies were also manufacturers of asbestos insulation products these individuals has used in the course of their work.

5. In addition to published information of all kinds, I examined files, unpublished information available from the U.S. government archives, the archives of scientists and the archives of institutions that had worked for and with asbestos companies.

6. I have also looked at unpublished information which was obtained in legal discovery. This included trade association minutes, corporate documents, and testimony of corporate officials who were associated with asbestos hazards over the years – doctors, plant managers, executives, and other people who were aware of events that transpired. For example,

I have reviewed documents obtained from the American Petroleum Institute ("the API") and the Industrial Health Foundation, formerly known as the Industrial Hygiene Foundation ("the IHF").

7. In addition to published information and corporate knowledge that came primarily out of legal discovery, I have also interviewed numerous current and former leading officials in the field of industrial medicine and hygiene. They included physicians who were active in the field of occupational medicine, such as Harold Stewart, who first published on asbestosis in 1931, and Alfred Angrist, who first published on asbestos and lung cancer in 1942. They are both pathologists. Another, Dr. Wilhelm Hueper, was a leading United States authority in the field of occupational cancer and first director of the environmental cancer section of the National Cancer Institute. Dr. Harriet Hardy, Dr. Thomas Mancuso, Dr. Gerrit Schepers, and others I interviewed were involved in the area of asbestos and health over the past decades.

8. I have acted as consultant for The National Science Foundation, the European Commission, the Environmental Defense Fund, and the Natural Resources Defense Council. I have provided testimony to United States congressional committees concerning the hazards of asbestos and other toxic substances. I have also testified before United States congressional committees regarding the development of asbestos knowledge. I have been a paid consultant to the Office of Toxic Substances of the United States Environmental Protection Agency and have performed research on environmental asbestos hazards. I have performed consulting work for the United States Occupational Safety and Health Administration. In my research, I have reviewed thousands of publications and documents pertaining to asbestos-related disease and have interpreted and related the contents of the same.

9. I have testified as an expert witness in over two hundred (200) cases throughout the nation on issues related to asbestos state-of-the-art and historical development of asbestos knowledge.

THE BODY OF KNOWLEDGE ABOUT ASBESTOS DISEASES

ASBESTOSIS

10. The originally published reports in the era of the modern asbestos industry came at just before the turn of the last century, and the first reports in the English language were

included in the annual reports of the chief inspector of factories and workshops in Great Britain. The report published in 1899, the report for the year 1898, talked about the observation of lung disease in individuals who had worked in asbestos manufacturing plants and about the "evil effects of asbestos dust."

11. The medical literature of asbestos disease mainly developed after the publication of a case report in the British Medical Journal by Dr. Cooke, a pathologist in Britain in 1924. This was called, "Fibrosis of the Lungs Due to the Inhalation of Asbestos Dust." Dr. Cooke reported on the death of a 33-year-old woman who had worked off and on in asbestos plants from the age of 13. According to Cooke, the scarring of her lung tissues was largely attributable to the inhalation of asbestos in the course of her work. There followed a number of other reports in British sources, and this is reflected as well in the United States in editorials of the Journal of the American Medical Association, In one on January 14, 1928, called "Pulmonary Asbestosis," reference is made to Cooke's case and other reports on the disease now called asbestosis. The Journal of the American Medical Association recommended that further attention be paid to this disease, as it may well be occurring in the United States. The Journal of the American Medical Association issued another editorial in 1930 about asbestosis, this time noting the asbestosis had become a compensable occupational disease in Great Britain under the workers' compensation law. The Journal of the American Medical Association was believed to have been read by 80 percent of American physicians in those years, medical historians have written. Additionally, there were additional reports of asbestosis published in the British Medical Journal, which is in every medical library I have ever walked into. The reports mainly involved deaths of individuals who were verified as having asbestosis by autopsy.

12. In 1930, a report was published by a physician, Dr. E.R.A. Merewether, and an engineer named C. W. Price. Merewether and Price reported a survey that had been conducted by the Factory Inspectorate in England, including 363 asbestos workers who were actively employed. Of these individuals, 26 percent were found to have asbestosis. Merewether and Price reported that the people longest exposed had the highest prevalence of the disease: 80 percent in workers with 20 years or more in the industry. There were no cases of asbestosis in

individuals with less than five years, and Merewether referred to that phenomenon that the disease was delayed in appearance and developed gradually over a period of years. It could in seven years be substantially developed in the most severe cases, but more often 11 years or more would elapse before the disease had become largely developed in exposed individuals. This is the time from the onset of exposure. Merewether urged that workers be "educated to a sane appreciation of the risk" to health posed by asbestos dust. Merewether's 1930 writings on asbestosis are among those most often cited in the literature on asbestosis.

13. By 1932 there were 60 or more publications in print on asbestosis. These were noted by way of reference in a bibliography published by the International Labor Organization in 1932. These publications continued to emerge from many countries. The first cases of asbestosis in the United States were reported in 1930. Asbestosis was also described in an article in the trade magazine Asbestos in the United States in the March 1930 issue, amid numerous advertisements from asbestos mining and manufacturing companies.

14. In 1932, the first case of asbestosis in an asbestos product user was reported at a conference held by the Industrial Commission of Wisconsin, which published their proceedings. Here, Dr. Albert Russell of the United States Bureau of Mines described an individual who had worked maintaining the insulations on pipes in a government hospital and had been diagnosed as having asbestosis and had been compensated by the government for disability sustained from this asbestos condition. This is the first published product user case. There were other cases reported in the United States in 1933 by Philip Ellman and also reported by Ellman in 1934 in The British Journal of Radiology. Wood and Gloyne reported in 1934 reported on cases of asbestosis including a boiler riveter who would have been exposed to asbestos because it was used as an insulation material on boilers. Wood & Gloyne's report was called "Pulmonary Asbestosis: A Review of 100 Cases." That was published in The Lancet, the world's oldest medical journal, in 1934. The Lancet is, like the British Medical Journal, a general medical journal published in England and available very widely in medical libraries in the English-speaking world. This article was widely cited in subsequent literature. Of the hundred cases of asbestosis they

reported on, the shortest duration of exposure in any case was six months, in the case of two women who had worked in an asbestos plant.

15. Literature on asbestosis was substantially developed by 1935. The disease was shown to have a distinctive pathological appearance with asbestos bodies, types of scarring that would form around the asbestos fibers trapped in the lung tissues. This was commented upon a great deal by pathologists in the 1920s. The disease was shown to have an identifiable radiological appearance on chest X-ray distinctly different from such diseases as TB and silicosis. The disease was also characterized by shortness of breath, which would become more pronounced as the individual became more seriously affected by the disease.

ALAN DOOLEY AND THE PENNSYLVANIA STUDY

16. In 1934 and 1935, the Industrial Hygiene Section of the Pennsylvania Department of Labor and Industry published a report on asbestosis in the asbestos fabricating industry in the state. This article was called Asbestosis, published by William B. Fulton and three of his coworkers at the Pennsylvania Department of Labor and Industry. Alan Dooley was one of Fulton's co-authors.

17. One-fourth of the workers examined by Fulton, Dooley and their team, had asbestosis. Their article included an impressive bibliography of 125 references to asbestos-related disease previously published in journals in the United States, England, France, Italy, Germany and other countries. Among the references cited by Fulton, Dooley et. al. were the historic 1930 report by Merewether and Price for the British government and the version published later that year in the US in the Journal of Industrial Hygiene. The Merewether reports made recommendations for the control of asbestos dust in asbestos plants, recommended periodic medical examinations of workers exposed to this dust, recommended dust suppression measures in processes involving the use of asbestos, and noted the hazards of asbestos insulation work in shipyards. The Pennsylvania study was one of the first surveys of this kind in the United States similar to that which had been done by Merewether and Price and published in Great Britain and the United States separately in 1930.

18. The Pennsylvania study also included an effort to relate dose and response. The authors had sampled the exposure of the workers to dust in four asbestos plants, including one that produced asbestos containing insulation known as 85 percent magnesia, and found that, overall, average concentrations of dust could be broken down into three groups that varied from 4.64 million particles per cubic foot up to 44 million. Asbestosis was reported in all three groups, with the prevalence and severity of disease greater in the more heavily exposed groups. But no level of exposure was found to be free of the disease, including levels below 5 million particles per cubic foot. In summary, in the Pennsylvania study at least 25 percent of the workers were diagnosed as having asbestosis and levels of exposure even below 5 million particles per cubic foot were found to cause asbestosis. Alan Dooley, who would become Texaco's industrial hygienist for many years, was a co-author of this report.

19. In 1938, a study similar to the Pennsylvania study was done by the Public Health Service, including an effort to account for workers who had been discharged before the Public Health Service was admitted to the North Carolina asbestos textile plants to do the study. An estimated asbestosis rate in the workplace was given as 27.5 percent. The report recommended that dust exposure in asbestos plants be limited to 5 million particles per cubic foot. This guideline was recommended as a tentative occupational exposure limit, though it was noted that the Pennsylvania study had found cases of asbestosis at that level of exposure.

20. By the mid 1930s, cases of asbestosis were found not only among workers in asbestos fabricating plants, but also among users of some asbestos products, mainly insulation products such as these used by insulation workers.

21. Another source of information about asbestos during this period was the National Safety Council, a national organization founded in 1912 as management's response to the industrial safety issue. Starting in the 1930's, the National Safety Council published numerous articles, pamphlets and other materials concerning the hazards of asbestos. Many of the annual NSC annual "congresses" included forums and discussions about dust disease. The "transactions" of these meetings were automatically mailed to the industrial members. For example, at the 21st Annual Safety Congress in 1932, Dr. Leroy Gardner presented a paper

entitled "The Effects of Mineral Dusts" that discussed asbestos dust as a lung hazard. Subsequently, at the 23rd Annual Safety Conference in 1934, Dr. Gardner delivered another paper entitled "Types of Dust That Cause Occupational Diseases." That paper noted that "the only other type of dust which is generally recognized as a cause of severe pulmonary injury is asbestos, a silicate of magnesium."

22. By the late 1930s, at least one company in the oil refining business was well aware of the dangerous propensities of asbestos and the existence of asbestos related diseases. In 1937, an industrial hygienist for Standard Oil of New Jersey (Roy Bonsib, Chief Safety Inspector) authored a document entitled Dust Producing Operations In The Production Of Petroleum Products And Associated Activities. In my opinion, this report establishes the "state of the art" concerning a variety of dust hazards in refining operations generally, including for asbestos dust. For example, the Bonsib report described a variety of dust producing operations typically occurring in petroleum refining operations, including the use of 85 percent magnesia insulation (15 percent asbestos) to insulate steam lines. It specifically stated that insulating 12 inch steam lines with 85 percent magnesia created "dust concentrations considered too high for working without adequate protection." It also stated that "any atmosphere in which dust is visible to the naked eye is certainly too dusty to be breathed with safety by human beings, and the wise, farsighted, human employer will immediately start to decrease the dust content in any atmosphere where dust is visible. " The Bonsib report identified asbestosis as a recognized disease and stated that asbestos dust, with its fibrous particles, did not seem to be readily handled by the protective mechanism of the lungs. The report also called for specific measures to reduce dust hazards in refineries - including the use of respirators, the isolation of dusty processes and the use of wet methods of operation to suppress dust at the point of its origin.

23. This report also noted as follows:

> Bathing and locker facilities – A conveniently located locker and wash room shall be designated... Separate lockers shold be provided for street clothes, work clothers, and one for Unionalls... The floors of the locker rooms where the men change their dust covered Unionalls and the benches shall be thoroughly moistened before being cleaned."

ASBESTOS AND LUNG CANCER

24. In 1935, another aspect of the hazard of asbestosis was identified with the publication of medical case reports of asbestosis in combination with lung cancer. The first such reports were published by Lynch and Smith in the United States in 1935 in the American Journal of Cancer and by Dr. Gloyne in Great Britain in Tubercle in two separate reports in 1935 and 1936.

25. In these reports, the question was raised that chronic irritation of the lung tissues from asbestos might be producing cancer as well as lung scarring already well identified as an asbestos-related phenomenon.

26. There were additional reports of lung cancer in combination with asbestosis reported by Egbert and Geiger at Yale in 1936, and Nordmann in 1938. An abstract of this last publication appeared in the United States in the Journal of Industrial Hygiene & Toxicology, also in 1938. The article was entitled "The Occupational Cancer of Asbestos Workers." The German author, Nordmann concluded that asbestosis was definitely related to lung cancer, that lung cancer was in fact an occupational disease of asbestos workers. Various features of the six cases Nordmann knew of were tabulated to justify that. Nordmann noted, among other things, that the prevalence of lung cancer among autopsied victims of asbestosis was one in six both in Germany and Great Britain. This was very much higher that the prevalence of lung cancer in the general population, which tended to be more like 1 percent or several percent at most. The high rate of lung cancer among people dying with asbestosis would be a most consistent finding around the world.

27. There were additional publications of cases of lung cancer and asbestosis in 1939 in the United States and in 1941 and 1942 in Germany. Holleb and Angrist reported in the American Journal of Pathology on two individuals who had been pipe coverers (users of asbestos products) diagnosed at autopsy as having both asbestosis and lung cancer. These were the first cases of cancer and asbestosis in users of asbestos products published in the medical literature. Holleb and Angrist tabulated a total of 10 cases of lung cancer in combination with asbestosis that had been published in the United States, Britain, and Germany.

28. Of special interest in this case may be the fact that articles linking asbestos and cancer appeared in the *Archives of Industrial Hygiene and Occupational Medicine* in the early 1950s. Recently, volumes of this journal from 1951 to 1955 were located in the library of Lamar University in Beaumont, Texas. The March, 1952 edition of this journal, which was in the Lamar library, contains and article by Dr. Wilhelm Hueper entitled "Occupational Cancer Hazards in American Industries." In the article, Dr. Hueper discusses the excessive incidence of lung cancer associated with asbestosis in a series of 235 documented cases of asbestosis.

29. Dr. Wilhelm Hueper is an important figure in the history of the knowledge of occupational cancer and in the development of the knowledge of asbestos hazards. In 1942, Dr. Hueper published a book on occupational cancer called Occupational Tumors and Allied Diseases, nearly 900 pages long. It included a lengthy section on asbestosis and cancer from asbestos, in which a large number of references from the United States, Great Britain and Germany were cited in support of the view that asbestos most likely did cause occupational cancer. Dr. Hueper made unequivocal statements the next year in the article called: "Cancer in its Relation to Occupational and Environment" published in the Bulletin of the American Society for the Control of Cancer. There, Hueper said that "asbestosis cancer of the lung" as he called it then, was the newest proved occupational cancer of the lung, to be listed with the ones that were already known at that time. In the Journal of the American Medical Association (JAMA), there appeared an editorial called "Environmental Cancer" in 1944, in which asbestos was listed among agents known and suspected of causing occupational cancer.

30. In 1946, Dr. Hueper also published an article in the Journal of the American Medical Association (JAMA) discussing asbestos and other cancer causing substances that were used in industry. In 1944 and 1949, at the invitation of the editors of JAMA, Dr. Hueper wrote editorials for JAMA that discussed asbestos as a cause of lung cancer. Beginning in 1948, Dr. Hueper became Chief of the Environmental Cancer Section of the National Cancer Institute ("NCI").

31. In 1946, Dr. Hueper also published an article in the Journal of the American Medical Association (JAMA) discussing asbestos and other cancer causing substances that were

used in industry. In 1944 and 1949, at the invitation of the editors of JAMA, Dr. Hueper wrote editorials for JAMA that discussed asbestos as a cause of lung cancer. Beginning in 1948, Dr. Hueper became Chief of the Environmental Cancer Section of the National Cancer Institute ("NCI").

32. In my opinion, during his tenure at the NCI, Dr. Hueper was the federal government's leading official concerned with environmental cancer. Indeed, it is my opinion that he was considered by many to be the world's foremost authority on environmental cancer in the 1940s, 50s, and 60s.

THE AMERICAN PETROLEUM INSTITUTE

33. In the early 1940s, the American Petroleum Institute ("API"), one of the primary trade organizations of the petroleum industry, established a Medical Advisory Committee ("MAC"). A document was published and disseminated that was entitled "The Carcinogenicity of Bituminous Compounds" and dated April 30, 1945.

34. This literature review contained an abstract of the article published by Dr. Hueper in June, 1943, "Cancer In Relation To Occupation and Environment." The abstract stated that asbestos was a cause of occupational cancer.

35. Additionally, in July, 1945, MAC Committee members also received a literature review authored by H.H. Zuidema of the Shell Oil Company that described asbestos as having cancer producing ability.

36. It is my opinion that the API Medical Advisory Committee was aware of Dr. Hueper's writings that asbestos was a cause of cancer. In 1948, members of the API's Medical Advisory Committee received a memorandum that was a summary of a paper presented by Dr. Hueper on occupational cancer before the American Public Health Association. The summary was sent by Clyde Berry, an Industrial Hygienist for Esso-Standard Oil Company to Dr. McIver Woody, Esso-Standard's Medical Director and, at that time, chairman of the API's Medical Advisory Committee. Mr. Berry's summary of Dr. Hueper's presentation stated that recent evidence had pointed out a definite correlation between cancer incidence and exposures to substances like asbestos. It was the practice of the committee to circulate copies of

memorandums such as this to its members. API documents show that Allan Dooley corresponded with Dr. McIver Woody, chairman of the MAC, on the day after Mr. Berry sent his memorandum on Dr. Hueper to Dr. Woody.

37. Additionally, in the early 1950s, Dr. Hueper was invited to appear at one of the API Medical Advisory Committee meetings. Then, in January 1953, another of Dr. Hueper's articles entitled "Environmental Cancers: A Review," originally published in 1952 in the journal Cancer Research, was reprinted and circulated to members and associates of the Medical Advisory Committee. This article pointed to asbestos dust as a carcinogenic agent for the development of lung cancer. It also discussed an increased incidence of lung cancer among persons with asbestosis and discussed the underreporting in the medical literature of "asbestosis cancer of the lung."

38. In 1955, another of Dr. Hueper's articles describing asbestos as an occupational cancer hazard was provided to the API. This article, "Occupational Cancer Hazards" was written by Dr. Hueper for a U.S. Department of Labor publication and was originally presented to the National Petroleum Association in 1954. It was then circulated by a member of the API's Medical Advisory Committee to other members prior to a meeting of the API's Medical Advisory Committee and its Subcommittee on Carcinogenity in April 1955. API documents show that Alan Dooley and Dr. Newquist were both listed as members of that subcommittee at that time.

39. In sum, it is my opinion that the medical and scientific literature established a definite connection between asbestos exposure and the development of lung cancer by the late 1940s.

40. It is my further opinion that members of the API Medical Advisory Committee during the 1940s and 1950s were aware that asbestos was a cause of cancer from the information provided to them through their activities with the API.

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THE INDUSTRIAL HYGIENE FOUNDATION

41. First established in 1936 under the name "Air Hygiene Foundation", this organization provided a means for doing confidential studies and compiling medical, legal and industrial hygiene knowledge for its member companies. The IHF was founded under the auspices of the Mellon Institute by a cross-section of large industrial companies. IHF would become one of the principal research contractors used by the asbestos industry. Vandiver Brown, a Johns Manville Company executive, initially described the IHF as "the creature of industry and the one institution upon which employers can rely completely for a sympathetic appreciation of their viewpoint."

42. The IHF conducted industrial hygiene research and medical surveys for various asbestos companies and the Asbestos Textile Institute. The IHF also arranged closed informal medical meetings among members in particular industries, not just the asbestos industry. There were regularly published IHF medical, engineering and legal conferences. Through vehicles such as confidential industrial hygiene surveys, annual conferences, and the *Industrial Hygiene Digest*, the IHF provided a full compliment of services to member companies. IHF meetings were covered by trade journals as well as newspapers like the *New York Times* and *Wall Street Journal.*

43. The *Industrial Hygiene Digest* is a particularly important publication. This digest, printed and distributed monthly to IHF member companies, contained literature abstracts from all the major medical, engineering, chemical and toxicological journals of the day. Through the *Digest* information was disseminated concerning the most important industrial hygiene studies of the day including during the period 1949 to 1959. Among the many abstracts of medical reports on asbestos, the Digest contained a case report of asbestosis in an autopsied insulation worker in 1950 and an epidemiological report of asbestosis in a cohort of insulators with more than 20 years in the trade, in 1957, contemporaneous to the time that Texaco was a member of the IHF and was receiving the *Digest.*

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44. Between 1949 and 1959, the *Industrial Hygiene Digest* published numerous other abstracts that reporting that asbestos was injuring workers by causing asbestosis and cancer. Three particular reports are illustrative.

45. In August 1949, the *Digest* reprinted an abstract of JAMA's editorial solely on asbestosis and lung cancer unsigned but authored by Dr. Hueper. The abstract stated the following: "Records of English, American and German physicians and the Annual Report of the Chief Inspector of Factories in England for 1947 show that the occurrence of cancer of the lung is related to pulmonary asbestosis. This relation is supported by the following observations: (1) the incidence rate of cancer of the lungs in asbestosis patients is 10 to 15 times as high as among the general population. (2) the male-female ratio is more nearly equal than it is for the general populations, which indicates that and environmental and evidently occupational carcinogen tended to equalize the incidence rate of cancer of the lungs for both sexes. Recent experimental observations support this interpretation of the clinical evidence."

46. It should also be mentioned that the original JAMA editorial from 1949 discussed the dangerous propensities of asbestos for "asbestos consuming industries." Certainly, oil refining would have to be considered in that category.

47. In 1952, the *Digest* published an abstract of an article entitled "Asbestosis Associated With Bronchiogenic Carcinoma" from the Archives of Internal Medicine. The abstract provided that "Investigators have found carcinoma in 7.5 to 14.8 percent of cases of asbestosis... the opinion is suggested that the silicate in asbestos must itself be carcinogenic. It establishes an additional reason for preventive measures in the use of asbestos."

48. In 1955, the *Digest* contained in abstract from the article "Mortality from Lung Cancer in Asbestos Workers," by R. Doll and published in the *British Journal of Industrial Medicine* in April, 1955. This study reported that among 18 asbestos textile workers out of a cohort of 105 asbestos textile workers, 18 died from lung cancer. Of those 18, 15 of the workers had underlying asbestosis.

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49. In an editorial published shortly after Doll's study was published, the prestigious British medical journal *The Lancet* editorialized that Doll's study confirmed that lung cancer is an occupational hazard of workers regularly working with asbestos.

ASBESTOS AND MESOTHELIOMA

50. The disease mesothelioma of the pleura was attributed to exposure to asbestos or asbestosis starting in 1943 with the report of Dr. H.W. Wedler in Heidelberg. Between 1943 and 1960, there were additional reports in the German literature as well as British literature. The case reports that appeared prior to 1960 are annotated and cited by way of reference in Chapter 2, table 5 of my book. Dr. Wedler was the first to state that he believed the pleural cancers were occupational cancers, and his work was prominently cited in the United States in the 1940s. Other German pathologists starting with Leicher in 1954 would identify peritoneal mesothelioma as an asbestos disease.

51. Of special note is the study by Dr. H.B.Eisenstadt and Dr. F.W.Wilson in the *Journal-Lancet* in 1960. Dr. Wilson was a medical doctor employed by Texaco at their Port Arthur facility. The study reported on two mesothelioma cases among Port Arthur refinery workers, one of whom had asbestosis. The report noted that, "the etiologic association of asbestos and mesothelioma has been repeatedly discussed in the literature", citing references from the US, the Netherlands, Germany, and Italy. It did note that not all investigators agreed that asbestos predisposed to the very uncommon malignancy of the pleura, but that the patient's history of asbestos exposure "alerted the suspicion of the authors in the second case."

52. A major report of pleural mesothelioma came from South Africa by Wagner and his coworkers, published in the *British Journal of Industrial Medicine* in 1960. Within a very short time it was widely accepted: that asbestos did cause mesothelioma; that levels of asbestos exposure present from environmental exposure as well as occupational exposure were sufficient to cause mesothelioma.

53. In 1964, Dr. Irving Selikoff and his coworkers published a mortality study in *JAMA* showing that there was a substantial excess of occupational cancer and deaths from asbestosis among people involved in the insulating trades. A group of workers who installed

insulation and removed it regularly was found to have 45 deaths from pulmonary cancer in a group where only six or seven such deaths would have been expected. There were four deaths from peritoneal and pleural mesothelioma in this cohort, and this was described as a very rare disease and a substantial excess over what would have been expected. There were also 12 deaths from asbestosis in this work force. The study also noted that the symptoms of these disease might not become manifest until decades after the exposures.

54. Subsequently, later in 1964, at an international conference held in New York and published in 1965, Selikoff and coworkers reported that around 80 percent of the people who were in the insulating trade had developed asbestosis by the time they had been in trade for 20 or 30 years or more. At the conference in New York, British researchers Newhouse and Thompson presented a report on 76 deceased mesothelioma patients and an equal number of "controls," based on interviews with relatives. Their report showed strong evidence that mesothelioma patients were far more likely to have had occupational, household, or neighborhood exposure to asbestos than the comparison patients who died from other causes at the same hospital.

55. As alluded to above, there were a number of studies and other publications that touched on the fact that workers who used asbestos products were at risk of asbestos-related disease. By the early 1940s, there were cases of asbestosis in insulation workers which had been confirmed by autopsy. Throughout the 1940s and 1950s, there are a number of published reports and/or studies which remark on asbestos-related illness, asbestosis, and/or lung cancer (in the end-users of asbestos-containing products). Examples of such articles and/or reports is contained on Pages 324 through 328 of my book, Asbestos: Medical and Legal Aspects, 5th Edition, Castleman (2005).

56. In conclusion, even in the absence of direct knowledge, by the years 1965 and 1966, a company engaged in the business of selling and distributing asbestos-containing products, and asbestos containing thermal insulation products (pipe coverings, blocks and muds) in particular, either knew or reasonably should have known, and provided warnings, about the hazards presented through exposure to the asbestos containing thermal insulation products it was selling and distributing.

METALCLAD

57. Metalclad did have actual knowledge of asbestos hazards. This is, in part, evidenced by historical Worker's Compensation claims for asbestos-related disease filed against Metalclad, for the following claimants and years: James Whitcomb Riley (1960); Clifford Harding (1961); Lola J. Crader (1966); Dean Clark (1966); John Faulkner (1963); Henry Puetz (1966); Melvin Hunt (1966); Leo Streithorst (1964); Vernon Lumbatis (1966); and John Swartout (1956), copies of which are attached hereto as Exhibits A – J respectively.

58. These workers' compensation claims allege that workers who worked for Metalclad using asbestos-containing insulation had sustained injuries for asbestos exposure. Thus they are relevant to notice on the part of Metalclad as to the dangers of performing insulation work. Specifically, these show that Metalclad had actual knowledge, and direct notice as early as 1960 that people working with and around asbestos-containing insulation could sustain potentially disabling and even life threatening illnesses, namely asbestosis. Shortly after that, through their involvement in the same worker's compensation claims, Metalclad would have learned that lung cancer was also a risk to those who work with or around asbestos insulation. Additionally, there is a large body of medical and scientific literature that Metalclad should have acquainted itself with by that time to the effect that people encountering asbestos from insulation work were at risk of developing potentially totally disabling or fatal occupational disease.

59. As such, Metalclad knew in the early 1960s that insulators, as well as bystanders working around the insulators, were at an increased risk of asbestos-related disease, and disability or death. Therefore in the early 1960s, Metalclad was aware of the adverse health effects of its products.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct. Executed this 24 day of August, 2010, in Garrett Park, Maryland.

BARRY I. CASTLEMAN, Sc.D.