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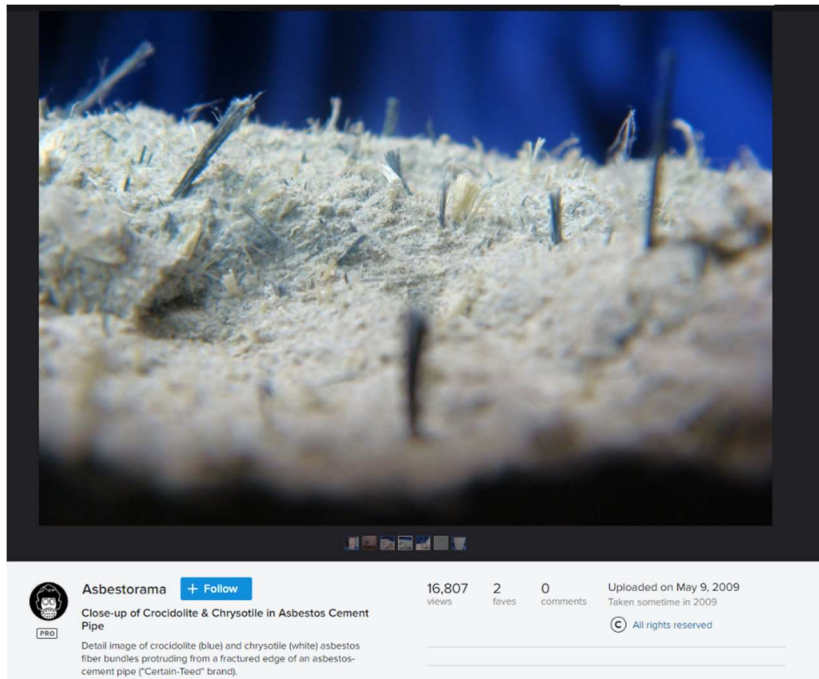
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**SOUTH AFRICAN BLUE ASBESTOS FIBERS AT
THE ILLINOIS BEACH STATE PARK:
MISTAKES OF OUR PAST,
CONCERNS FOR THE FUTURE**



Picture taken by Jeffery Camplin at Illinois Beach State Park in 2003



Crocidolite (Blue Asbestos) and Chrysotile (White Asbestos) Fibers in a Deteriorating Asbestos-Cement Pipe. Picture Courtesy of Asbestorama. The Ability for the Handling of, or Wave Action Involving the Pipe Potentially Liberating the Exposed Blue and White Asbestos Fibers from the Cement Pipe into the Air, Beach, or Water is not in Serious Scientific Doubt.



Crocidolite (Blue Asbestos) Fibers being Liberated to the Environment from a Deteriorating Asbestos-Cement Pipe
Picture Courtesy of Joe Frasca



Crocidolite (Blue Asbestos) and Chrysotile (White Asbestos) Fiber Bundles being Liberated to the Environment from a Deteriorating Asbestos-Cement Pipe

Picture Courtesy of Tony Rich



Crocidolite (Blue Asbestos) Fibers being Liberated to the Environment from a Deteriorating Asbestos-Cement Pipe

Picture Courtesy of Illustrated Practical Asbestos by F. Stephen Masek, page 28



**Ben Smidt / STAFF
PHOTOGRAPHER**

Environmental researcher Jeffery
Camplin holds up a large piece of
asbestos found washed up on the
Waukegan Municipal Beach. It was one
of several he collected during a walk on
the shoreline.

os, said Camplin.

we are finding at Illinois Beach State Park."

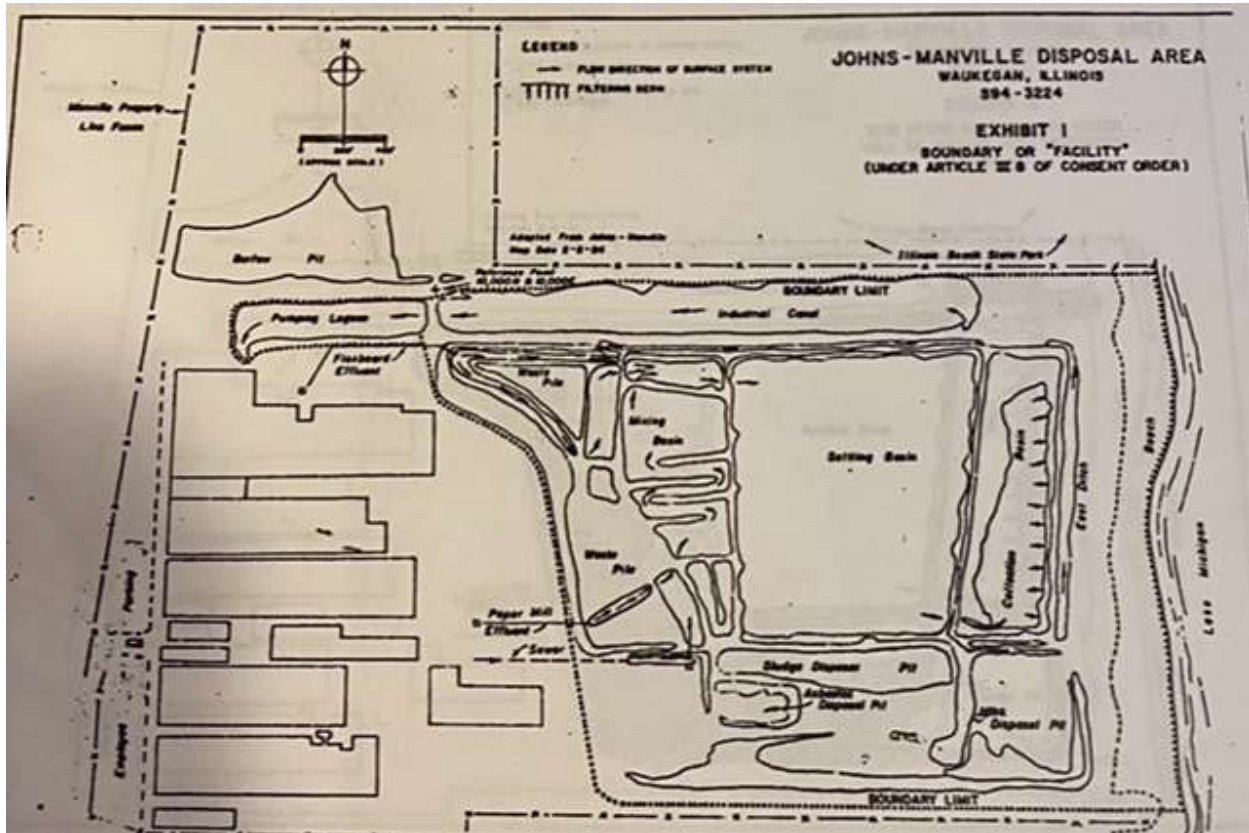
June 22, 2005 Photograph of Jeffery Camplin taken by Ben Smidt of the Lake County News-Sun on the Waukegan Municipal Beach immediately south of the former Johns-Manville facility. It was one of 20 similar samples found that day. Mr. Camplin believes that this piece of pressure water piping would have come from the John's Manville waste pile. The Photograph was in the July 7, 2005 newspaper edition,

ABSTRACT

SOUTH AFRICAN BLUE ASBESTOS FIBERS AT THE ILLINOIS BEACH STATE PARK:

MISTAKES OF OUR PAST, CONCERNS FOR THE FUTURE. The primary focus of this paper examines the issues arising from the historical importation of Crocidolite (blue asbestos) fibers by Johns-Manville from South Africa for use in its Waukegan, Illinois, manufacturing facility, including the health hazards to the users and workers at the local park system and Lake Michigan shoreline arising from the legacy waste fibers. By focusing on blue asbestos rather than on Chrysotile (white asbestos) or general “amphibole” fibers, in combination with the danger to children arising from the blue asbestos fibers, this research becomes novel and adds to the historiography discussing asbestos-related health hazards at Illinois Beach State Park. In addition, this paper focuses on the paradox arising from the need for public safety and to protect the environment in comparison with the economic and recreational needs of the community.

INTRODUCTION



1

Asbestos, once considered the magic mineral for its insulation and fire resistant properties, is now considered by the World Health Organization to kill over 100,000 people annually just from exposures in the workplace, and tragically pollutes areas of the environment that likely will never recover. The World Health Organization recommends that stopping the asbestos-related diseases will require eliminating the exposure to asbestos fibers themselves, including both as the fibers remain in place and during their removal.² This historical research

¹ "Map from United States District Court, Consent Order March 21, 1988," *United States of America v. Manville Sales Corporation, Inc.* (Copy at Author).

² World Health Organization, "Asbestos," *Chemical Safety and Health*, n.d. <https://www.who.int/teams/environment-climate-change-and-health/chemical-safety-and-health/health-impacts/chemicals/asbestos>

thesis is a discussion on one such situation in the geographic area around the northwestern Lake Michigan, Illinois shoreline involving the most dangerous type of asbestos fiber, crocidolite (blue asbestos), in the uncontrolled presence of our most vulnerable population: children. The geographic location, known as the Crown Jewel of the Illinois state park system, is an amazing environmentally sensitive area and, yet, amenable to significant recreational activities such as boating, fishing, bicycling, and beach activities.³ The park is globally designated under the Ramsar Convention on Wetlands. Visitors can experience, along with those recreational activities, nature at its finest including ice volcanoes, quicksand, ridge and swale development, and walking paths through nature preserves. The landscape and improvements are virtually perfect for family vacations involving young children both in terms of education and coming face to face with nature, beach and water activities.. This historical research thesis identifies and analyzes not only the environmental pollution and health risks arising from such activities, but also the all too often experienced paradox of balancing those concerns with the economic and recreational needs of the community.

Starting in 1922, and continuing until June 1989, the Johns-Manville factory in Waukegan, Illinois, bordering the shore of Lake Michigan 50 miles north of downtown Chicago, discarded a total of 600,000 tons of toxic asbestos-containing material into a waste pile that

³ Out Our Front Door, “Bike Camping the Crown Jewel – Illinois Beach State Park,” January 3, 2017. Accessed April 26, 2024. <https://www.oofd.org/trail-blog/bike-camping-the-crown-jewel-illinois-beach-state-park>. The park operates a world-class marina with all the recreational expectations in the northern part with significant nature activities in the southern part adjacent to the former Johns-Manville facility at issue. This proximity at times causes conflicts as the tidal processes pushes potentially polluted sand south toward the Oak Street Beach, called one of the 25 best beaches in the United States, and eventually Indiana.

eventually reached 60 feet above the natural ground level.^{4 5} This waste consisted of trim, rejected product, and materials unused in the manufacturing products.⁶ Additional asbestos-containing waste was disposed of in an adjoining excavated pit about 150 feet in diameter. The waste dumping areas bordered Lake Michigan to the east and the and the land that would eventually become the Illinois Beach State Park (IBSP) to the north.⁷ The asbestos waste pile was only 100 feet from Lake Michigan.⁸ These wastes included both friable (easily crumbled) and non-friable consolidated asbestos bound with other material.⁹ In addition, Johns-Manville provided asbestos-containing waste to build roads in the community and to build a raised bank berm for the 1959 Pan Am Games shooting contest.¹⁰

Asbestos waste in the waters off Waukegan became an immediate issue in the early 1920s after the factory become operational. At least one interview during the 1980s investigating lake trout issues noted that by 1922, asbestos-waste fibers 6 to 12 inches thick was encountered when

⁴ Gene A Lucero, Director, Office of Waste Programs Enforcement, “Authorization to Proceed with Remedial Investigation/Feasibility Study at the Johns-Manville site, Waukegan, Illinois – ACTION MEMORANDUM,” *United States Environmental Protection Agency*, 9/19/83, pages 1-2. Document Number 137668 and United States District Court, Northern District of Illinois, Eastern Division, “Plaintiff’s motion for entry of consent decree lodged with this court on February 28, 1988 is granted,” March 21, 1988, p. 13; Unknown, “II. Description of Site,” p. 2. Document No. 137641.

⁵ Per the United States Environmental Protection Agency, as recently as on March 18, 2024, “Exposure to asbestos is known to cause lung cancer, mesothelioma, ovarian cancer, and laryngeal cancer, and is linked to more than 40,000 deaths in the U. S. each year.” United States Environmental Protection Agency, “Biden-Harris Administration finalizes ban on ongoing uses of asbestos to protect people from cancer,” <https://www.epa.gov/newsreleases/biden-harris-administration-finalizes-ban-ongoing-uses-asbestos-protect-people-cancer>

⁶ Unknown, “II. Description of Site,” p. 1. Document No. 137641.

⁷ *Ibid.*, 2.

⁸ Lake County Economic Development Commission, “Letter to Vanessa Musgrave of the U.S. EPA,” July 26, 1984, p. 1. Document Number 137829.

⁹ Norman Niedergang, On-Scene Coordinator, “Manville Site, Waukegan, Illinois,” *Memo with attachment*, Aug 12, 1982, Document 137825.

¹⁰ Paul Kakuris, “Interview with Martin Ditkof,” April 7, 2024 and April 24, 2024. Original with Mr. Ditkof. Matthew J. Ohl, “Enforcement Action Memorandum to Richard C. Karl, Director Superfund Division,” *United States Environmental Protection Agency*, October 16, 2015, p. 3. Document 494781. <https://semspub.epa.gov/work/05/922167.pdf>

wading off shore in the area.¹¹ Beginning in the 1970s, the scientific and governmental communities recognized that the facility was potentially responsible for asbestos fibers in the raw waters of Lake Michigan.¹² In 1983, a total of 350 acres of the Johns-Manville Waukegan facility were designated as a Superfund site by the United States Environmental Protection Agency (EPA) primarily for this asbestos exposure, with a requirement that Johns-Manville fund a cleanup that it negotiated with the EPA and the Illinois Environmental Protection Agency (IL EPA). The agreement including installing onsite wells and undertaking air, groundwater, and surface water monitoring for up to 30 years. The plan also included Johns-Manville providing a soil covering to prevent asbestos from rising to the soil surface.¹³

At the time that the facility was designated as a Superfund site as discussed above, Johns-Manville, which had filed for bankruptcy protection, and the EPA, claimed that such actions would be sufficient to stop any pollution or migration of the asbestos.¹⁴ Not everyone agreed. On July 30, 1984, charter boat operator Tom Gockel of Lake Villa, Illinois, wrote to the EPA and asked that the arrangement between the government and Johns-Manville, concerning the Superfund site, include coverage “for the testing, monitoring, and, [sic] correction for hazardous

¹¹ Catherine E. Coberly and Ross H Horrell, “A Strategy for Re-establishing Self-Sustaining Lake Trout Stocks in Illinois Waters of Lake Michigan,” *Report No. 42*, (Madison, Wisconsin: University of Wisconsin-Madison, March 1982).

¹² Carolyn S. Hesse and William H. Hallenbeck, “Potential Sources of Asbestos in Lake Michigan,” *Journal of Great Lakes Research*, Vol 4, Issue 1, 1978, p. 57-61.

<https://www.sciencedirect.com/science/article/pii/S0380133078721659>

¹³ United States Environmental Protection Agency, “Asbestos as Superfund Sites,” Accessed March 23, 2024, <https://www.epa.gov/superfund/asbestos-superfund-sites>. (The EPA Superfund program involves abandoned hazardous waste site identification and remediation. Asbestos pollution is within the Superfund program when it arises from “past industrial operations or improper waste disposal.”); and United States District Court, Northern District of Illinois, Eastern Division, “Plaintiff’s motion for entry of consent decree lodged with this court on February 28, 1988 is granted,” March 21, 1988, p. 12-19; United States Environmental Protection Agency, “Superfund Sites in Reuse in Illinois, Johns-Manville Corp.,” Accessed March 23, 2024, Last updated December 2023, <https://www.epa.gov/superfund-redevelopment/superfund-sites-reuse-illinois#johns>. See also Arcadis, “Draft Phase II Remedial Work Plan (30% Design) for Closure of Industrial Canal, Pumping Lagoon and Collection Basin, Johns-Manville, 1871 North Pershing Road, Waukegan, Illinois 60087,” December 2, 2010, p. 1.

¹⁴ Valdas V. Adamkus, “Record of Decision, Remedial Alternative Selection, Johns-Manville-Waukegan, Illinois Disposal Area.” June 30, 1987. Document No. 137910, p. 1-21.

wastes from the Johns-Manville area to [the] Illinois State Park and Beach and Lake Michigan...”¹⁵ Two days later, on August 1, 1984, the EPA responded to Mr. Gockel with the proverbial suggestion that he, in essence, pound sand.¹⁶

The EPA’s response to Mr. Gockel did not disclose that the scientific and governmental communities were well aware as of 1978, six years earlier, that the asbestos-containing waste had potentially migrated off the Johns-Manville Waukegan facility and into Lake Michigan (including prior to 1968 discharging effluent wastewater directly in the lake through a settling pond system). The EPA’s response also did not address the scientific community’s recommendation in 1978 that wet and dry deposition from the vicinity of that facility be monitored as a potential source of asbestos contamination migrating into the lake.¹⁷ As of 1978, both Chrysotile and amphibole asbestos fibers had been discovered in raw Lake Michigan water samples taken from the southern end of Lake Michigan along its western shore just north of Chicago. Even as of far back as 1978, 45 years ago, this presence of asbestos fibers in the lake water was recognized as a potential health hazard.¹⁸ Given that an estimated 12,067 people have died between 1999 and 2017 in Illinois from asbestos exposure, this is a substantial health concern to the residents of the northern counties which abut Lake Michigan, such as Cook

¹⁵ Tom Gockel, “letter to Vanessa Musgrave at the United States Environmental Protection Agency Region V,” July 30, 1984.

¹⁶ Vanessa Musgrave, “letter to Tom Gockel at Gockel Marine Charters,” August 1, 1984.

¹⁷ Carolyn S. Hesse and William H. Hallenbeck, “*Potential Sources of Asbestos in Lake Michigan*,” *Journal of Great Lakes Research*, Vol 4, Issue 1, 1978, p. 57-61. The Johns-Manville Waukegan facility was identified as one of a number of possible sources for the asbestos in the raw water with the researchers recommending further investigation. <https://www.epa.gov/superfund-redevelopment/superfund-sites-reuse-illinois#johns><https://www.sciencedirect.com/science/article/pii/S0380133078721659> The Johns-Manville facility is not the only responsible party for the asbestos contamination in that geographic area as the Illinois Office of the Attorney General in February 2000 identified several other potential sources including other commercial enterprises and governmental units. See, Matthew J. Dunn, Chief Environmental Enforcement/Asbestos Litigation Division, “Letter Re: Draft Report on Potentially Responsible Parties for ACM as Illinois Beach State Park,” Chicago, February 4, 2000. This research article focuses on the Johns-Manville related issues because of the documented use of blue asbestos in the facility and the disposing of the asbestos waste in the outdoor environment adjacent to IBSP.

¹⁸ *Ibid.*, 57.

County (3863 deaths) and Lake County (897 deaths).¹⁹ Further, as asbestos-related diseases are remote in timing from the exposure for 20 to 40 years, it is difficult to estimate the number of people who are already destined to pass away from past exposures.

In summary, in part because of the lack of governmental attention and appropriate remediation, 40 years after Mr. Gockel sent his 1984 letter to the EPA, the park, its beaches, and the coastal area offshore continues to have significant asbestos-related environmental and health concerns.²⁰ Compounding the risks, state and federal governmental agencies continue to dispute and minimize the effect of the asbestos-related issues at IBSP.²¹ As an example, the EPA currently claims that the remediation actions were complete as of 2017, with the exception of one acre, although acknowledging as of December 2023 that site inspections, maintenance, and groundwater monitoring activities will need to continue.²² If the risk was truly alleviated, then no such continual supervision and cleanup would be necessary.

In paradox to the asbestos-related issues, IBSP is, at the same time, critical to the local economy and recreational health of the community. As such, this situation gives rise to the paradox of two competing needs: (1) community economics and recreational activities versus (2) the safety of that community and its individuals. The tourism and recreational activities of this community are directly dependent on an attraction that poses environmental and health hazards to them. This paper will examine the intersection of history and science as it gives rise to this

¹⁹ Asbestos Nation, Accessed April 25, 2024. <https://www.asbestosnation.org/facts/asbestos-deaths/il/>. There is no way of knowing without some degree of guessing on how many of these illnesses were caused by exposure to blue asbestos fibers at IBSP.

²⁰ IBSP is also known as the Adeline Jay Geo-Karis Illinois Beach State Park. The park will be referred to as IBSP throughout this paper.

²¹ See, for example, Lake County News-Sun, “A decade of asbestos inaction,” Thursday July 26, 2007 that chronicles the history of asbestos-related activity at the Illinois Beach State Park from February 1998 through April 2007.

²² United States Environmental Protection Agency, “Superfund Sites in Reuse in Illinois, Johns-Manville Corp.,” Accessed March 23, 2024, Last updated December 2023.

paradox involving the competing needs. Then, based on the existing science, this paper will propose recommendations to address the issues.

The primary focus of this paper will examine the health-related issues arising from the international importation of blue asbestos fibers by Johns-Manville, from South Africa, for use in its Waukegan, Illinois, manufacturing facility, including the long-term impact on IBSP arising from the waste blue asbestos fibers being removed from the manufacturing operations. By focusing on blue asbestos rather than on Chrysotile (white asbestos) or general “amphibole” fibers, this research becomes novel and adds to the historiography discussing potential asbestos-related health hazards at IBSP.²³ This research differs its analysis from prior literature by analyzing the following important factors: (1) discussing why blue asbestos is the most dangerous of all asbestos fibers, including specific risks arising from exposure to children; (2) examining where blue asbestos was used in the Johns-Manville Waukegan facility over a 40 plus year time frame; (3) identifying that blue asbestos as waste from the manufacturing operations was disposed of onsite or donated to the Waukegan area community for local uses; and (4) analyzing the danger to those people in the vicinity. The Johns-Manville outdoor asbestos waste pile and waste pit disposal land was located directly adjacent to IBSP. Further, the asbestos sample testing in the 1990s and 2000s, after Johns-Manville ceased using asbestos, showed the continued presence of blue asbestos at and near IBSP in multiple locations. As blue asbestos does not naturally exist in Illinois, its presence at IBSP, to the extent that it remains in that location, would be cause for significant concern.

²³ The overwhelming number of studies on the IBSP asbestos-related issues focus their analysis on white asbestos and potentially amphibole asbestos fibers in general. See, for example, the 2007 study by the Agency for Toxic Substances and Disease Registry, “Exposure Investigation Report: Illinois Beach State Park, Zion, Lake County, Illinois, EPA Facility ID: ILD984840140,” *U.S. Department of Health and Human Services*. Atlanta; October 19, 2007.

This paper will also discuss in detail the background of IBSP and its importance to the community. There is no better historical source to begin the discussion than statements by Paul Kakuris, President of the Illinois Dunesland Preservation Society,²⁴ in combination with the Summary and Background sections of the Illinois Department of Natural Resources May 23, 2007 “Draft Asbestos Management in Adeline Jay Geo-Karis Illinois Beach State Park (A Supplemental Management Plan).”²⁵ All agree that IBSP is a special asset in Illinois for “all to enjoy,” including providing high quality recreational activities such as swimming, picnicking, fishing, and camping.²⁶ IBSP is not just an ordinary beach or park but, rather, a spectacular and unique 4,160-acre asset designated as a state park on July 13, 1953, most of the acreage being protected as state dedicated preserves, and enjoyed by more than 3 million people annually.²⁷

The fact that an asbestos-containing toxic waste dump for Johns-Manville was developed beginning in 1922 and continued in use through the 1980s, adjacent to such a rare and unique public asset, shows how environmental issues and society’s understanding of the need to protect the environment have changed over time. Today, the land would be considered sacrosanct. The situation in the general vicinity of IBSP is made worse by the natural southernly coastal

²⁴ The Illinois Dunesland Preservation Society is a not-for-profit environmental advocating organization that often interacts with government agencies on policy issues related to IBSP. It does not have any formal government authorization (as do not most environmental advocacy organizations such as the Sierra Club and Greenpeace) but, rather, provides its advocacy as a public service. The society’s website is at <https://illinoisdunesland.org/index.html>.

²⁵ Illinois Department of Natural Resources, “Draft Asbestos Management in Adeline Jay Geo-Karis Illinois Beach State Park (A Supplemental Management Plan),” May 23, 2007.

²⁶ *Ibid.*, 1; Michael J. Chrzastowski and Wayne T. Franke. “Guide to the geology of Illinois Beach State Park and the Zion Beach-Ridge Plain, Lake County, Illinois,” *Illinois Department of Natural Resources, Illinois State Geological Survey*, (Hathi Trust, 2000), p. 1.

²⁷ Illinois Department of Natural Resources, “Draft Asbestos Management in Adeline Jay Geo-Karis Illinois Beach State Park (A Supplemental Management Plan),” May 23, 2007, p. 1; Michael J. Chrzastowski and Wayne T. Franke. “Guide to the geology of Illinois Beach State Park and the Zion Beach-Ridge Plain, Lake County, Illinois,” *Illinois Department of Natural Resources, Illinois State Geological Survey*, (Hathi Trust, 2000), p. 1.

processes that spread the invisible asbestos fibers contained within the sand and tailing waste to other beaches abutting the shores of Lake Michigan.

This paper will then combine the discussion on IBSP and the interaction with asbestos and children playing at the park, including examining the potential for health-related issues potentially caused by the blue asbestos from such activities. Of particular importance are the historical tests discussed later in this paper as Table 1 that show the presence of blue asbestos at or near IBSP, given that only a few days of exposure to blue asbestos can cause the development of mesothelioma cancer. The analysis will discuss the two potential pathways for asbestos to cause serious disease, inhalation and ingestion, with a discussion of the testing for those pathways involving the IBSP and how the science has progressed over time.²⁸ As an example, in 1983, the existing science then claimed that ingestion of asbestos fibers through drinking water was harmless.²⁹ As of 2022, the opposite may be true, as scholarly research now shows asbestos fiber ingestion through drinking water provided in older corroding asbestos-cement water pipes may cause various cancers such as gastrointestinal and colorectal.³⁰ Other research shows that, in addition to inhalation-related cancers, asbestos exposure can cause ovarian and laryngeal cancers.³¹ This paper will discuss problems with historical science involving asbestos exposure

²⁸ As dermal contact has only been shown to cause asbestos corns and warts with no known pathological long term problems, this paper will not address this exposure. See Alice Hamilton and Harriet L. Hardy, *Industrial Toxicology*, 3rd ed., (Acton, MA: Publishing Science Group, Inc., 1974), p. 424.

²⁹ B. T. Cummons, “Asbestos Fibres in Drinking Water,” (Cummins Associates: England, May 1983), p. 11 (“A very important finding is that despite numerous animal feeding studies, the accumulated evidence for ingested asbestos being a carcinogen seems to be zero.”).

³⁰ Janez Zavasnik, Andreja Sestan, and Sreco Skapin. “Degradation of asbestos – Reinforced water supply cement pipes after a long-term operation,” *Chemosphere*. (2022), 287, p. 2 and 8 (“The presence of asbestos fibers in potable water distribution systems results from degradation of the AC pipe after a long-term operation.”) and (“The release of fibres into the water supply may pose a health risk to those who drink and use such waters.”); S. Mager, M. Knopick, and G. Oddy, “The concentration and prevalence of asbestos fibres in Christchurch, New Zealand’s drinking water supply,” *Water Supply*, Volume 22, No 4, 2022, p. 4445-4456. <https://water360.com.au/wp-content/uploads/2022/09/Mager-et-al-2022-Asbestos-water-pipes-in-New-Zealand.pdf>

³¹ Sugio Furuya, Odgerel Chimed-Ochir, Ken Takahashi, Annette David, and Jukka Takala, “Global Asbestos Disaster,” *International Journal of Environmental Research*, National Library of Medicine, May 16, 2018, p. 2. <https://pubmed.ncbi.nlm.nih.gov/29772681/>

including intentional misrepresentations, mistakes, and the advancement of knowledge, and how such scientific issues contribute to the current uncertainty about blue asbestos exposure at IBSP.

Taking all of the above science, facts, and history into account, this paper concludes by providing certain recommendations with a focus on the competing issues involving the recreational needs of the community in the context of the health-related risks arising from the presence of blue asbestos at IBSP and the surrounding community. This paradox is not limited to the issues at IBSP but, rather, is representative of similar asbestos-related situations occurring globally.

The Uniqueness and Dangers Arising from Blue Asbestos

Asbestos is a generic reference to a group of hydrated mineral silicates that can be separated into filaments. The term “asbestos” refers to a group of minerals that generally share properties involving thermal resistance, chemical resistance, flexibility, and high tensile strength.³² The six commercial forms include five amphibole varieties with the following commercial names: (1) Actinolite; (2) Anthophyllite; (3) Amosite (brown asbestos, mineral name grunerite); (4) Crocidolite (blue asbestos, mineral name riebeckite); and (5) Tremolite, and one variety of serpentine mineral - Chrysotile (white asbestos, mineral name serpentine).³³ Asbestos has characteristics of the animal kingdom, the vegetable kingdom, and the mineral kingdom. Oliver Bowles states, “To the scientist, asbestos is a physical paradox, being both fibrous and crystalline. It is a rock that may be spun into yarn – a yarn that can be woven into a soft flexible cloth that will not burn. Asbestos thus becomes a connecting link joining the animal and

³² Victor L. Roggli, S. Donald Greenberg, and Philip C. Pratt, *Pathology of Asbestos-Associated Diseases*, (Boston, Little Brown & Company, 1992), p. 1.

³³ Office of Toxic Substances, “Life Cycle of Asbestos in Commercial and Industrial Use including Estimates of Releases to Air, Water and Land, Final Inhouse Report,” *U.S. Environmental Protection Agency*, GCA-TR-79-73-G. (Bedford, MA, February 1982), p. 27.

vegetable kingdoms with the realm of minerals.”³⁴ Historically, most of asbestos was mined in other countries and then imported to the United States for processing or incorporation into manufactured products.³⁵ Although asbestos had some usefulness in ancient times, the first evidence of it being used consistently in commerce is 1830.³⁶

Asbestos fibers were combined with other materials for use in up to 3,000 products. Most of the asbestos fibers used in these products were white asbestos, with a significantly lower amount of brown asbestos and blue asbestos.³⁷ As to asbestos-cement pressure water pipes such as those manufactured by Johns-Manville in its Waukegan facility using blue asbestos, this product line was introduced to the United States market in 1931.³⁸

Blue asbestos fibers were first discovered between 1803 and 1806. The name “Crocidolite” was proposed in 1831 by J. F. L. Hausmann meaning “woolly stone.”³⁹ As discussed below, the first blue asbestos mines in South Africa, the primary commercial mining location, opened in 1893 and closed in 1997. The production peaked in 1977 at 201,000 tons and dominated South Africa asbestos mining from 1956 through 1982.⁴⁰ Blue asbestos is native primarily to South Africa and Western Australia, with some worthy of commercial use found

³⁴ Oliver Bowles, *Asbestos: The Silk of the Mineral Kingdom*, The Ruberoid Corporation, 1946).

³⁵ Ibid, 28. Ralph E. Oesper as translated from Hans Berger, *Asbestos Fundamentals* (New York: Chemical Publishing Company, 1963), p. 2.

³⁶ “The Penny Magazine,” *The Society for the Diffusion of Useful Knowledge* (England: October 26, 1839), p 411.

³⁷ United States Department of the Interior, “Asbestos,” *Geological Survey*, Washington D.C. : 1973, p. 63 - 64. See also, Office of Toxic Substances, “Asbestos: a review of selected literature through 1973 relating to environmental exposure and health effects,” *Environmental Protection Agency*, Washington D.C. January 1976, p. 60.

³⁸ GCA Corporation, “Life Cycle of Asbestos in Commercial and Industrial Use Including Estimates of Releases to Air , Water, and Land,” *U.S. Environmental Protection Agency* GCA-TR-79-73-G, Bedford, MA: February 1982, p. 115.

³⁹ Oliver Bowles, *The Asbestos Industry*, United States Department of the Interior. (Washington D.C.; United States Government Printing Office, 1955), p. 36.

⁴⁰ Robert L Virta, “Worldwide Asbestos Supply and Consumption Trends from 1900 through 2003,” Circular 1298, *United States Department of the Interior, United States Geological Survey*, 2006, p. 9.

naturally in Bolivia. Blue asbestos is not native to most of North America other than some non-commercial outcroppings.⁴¹

Blue asbestos is unique. Blue asbestos is a monoclinic amphibole. Its chemical composition can vary, but typically includes silicate of sodium, a high iron content, and some combined water. It is finely fibrous and tends to be lavender, blue, or greenish with a silky to dull luster. The fiber is typically a maximum of 1½ to 3 inches in length and has a texture of medium fine to coarse. It is typically thinner than Amosite fibers. It also appears straight under an electron microscope. Blue asbestos has the highest tensile strength of all the asbestos fibers and the lowest heat resistance. It is fairly resistant to chemicals. Blue asbestos is different than other asbestos fibers as it has a high refractive index and a high pleochroism to identify. In addition, unlike Chrysotile hollow fibrils, amphiboles, such as blue asbestos, are more solid and more coarse. Blue asbestos was used primarily in textiles, insulations, and building materials.⁴² When the asbestos products manufacturers needed blue asbestos, they imported it. Johns-Manville primarily imported blue asbestos from South Africa.⁴³

As early as 1928, Johns-Manville was funding testing to determine whether asbestos was an occupational hazard.⁴⁴ Asbestos inhalation is known to cause three diseases: asbestosis, lung

⁴¹ See, for example, Mindat.org which discusses crocidolite from Marin County, California. <https://www.mindat.org/locentry-159454.html>

⁴² Johns-Manville Corporation, “Defendant Manville Corporation Asbestos Disease Compensation Fund’s Response to Plaintiffs’ Interrogatories,” *Harry Dougherty and Grace Dougherty, In the United States District Court, for the District of Delaware*, November 21, 1989, p. 6-7; Office of Toxic Substances, “Asbestos: a review of selected literature through 1973 relating to environmental exposure and health effects,” *Environmental Protection Agency*, Washington D.C. January 1976. P. 1, 11, and 60.

⁴³ Johns-Manville Corporation, “Defendant Manville Corporation Asbestos Disease Compensation Fund’s Response to Plaintiffs’ Interrogatories,” *Harry Dougherty and Grace Dougherty, In the United States District Court, for the District of Delaware*, November 21, 1989, p 42.

⁴⁴ *Ibid.*, 47. Johns-Manville received claims of asbestos related disease such as asbestosis as early as 1928 arising from its workers in the Manville, New Jersey manufacturing facility. See <https://theasbestosblog.com/?p=769>. These dozen cases were resolved for \$30,000 in 1933 along with a confidentiality agreement and agreement by the workers’ attorney that he would not file any more of those lawsuits.

cancer, and mesothelioma. Blue asbestos is the most dangerous and toxic of the asbestiforms.⁴⁵ As stated in the conclusion of a South African study of asbestos fiber type, "...it must be concluded that [blue asbestos] represents the greatest hazard to human health."⁴⁶ At least one scholarly article in a medical research journal states that blue asbestos is 376 times more likely to cause mesothelioma than is white asbestos. The authors believe that this is similar to a prior study, where the ratio was 500 to 1 rather than 376 to 1.⁴⁷ Either way, it is substantial. According to the EPA, legacy asbestos-cement pipes contain approximately 12-15% of asbestos fibers, including blue, white, and brown asbestos.⁴⁸

The danger arising from inhalation exposure to blue asbestos is recognized as being significant by all involved governmental agencies and asbestos experts. As an example, the World Health Organization and the European Commission, among other organizations, state for blue asbestos: "Do NOT let this chemical enter the environment."⁴⁹ Further, the experts in the field recognize that extremely short exposure to any asbestos fibers is sufficient to cause

⁴⁵ Abramson Cancer Center, "How are People Exposed to Asbestos," *Penn Medicine*, <https://www.pennmedicine.org/cancer/types-of-cancer/mesothelioma/causes-risks-prevention/what-is-asbestos>

⁴⁶ Neil White, Gill Nelson, and Jill Murray, "South African experience with asbestos related environmental mesothelioma: Is asbestos fiber type important," *Science Direct: Regulatory Toxicology and Pharmacology*, (2007), 1-5, p. 4. <https://pubmed.ncbi.nlm.nih.gov/18023951/>

⁴⁷ David H. Garabrant and Susan T. Pastula, "Abstract, A comparison of asbestos fiber potency and elongate mineral particle (EMP) potency for mesothelioma in humans," *Toxicology and Applied Pharmacology*, 2018, p127-136. <https://pubmed.ncbi.nlm.nih.gov/30077661/>. ("...the relative potency of chrysotile: amosite; crocidolite was 1:83:376...). See the article itself on page 134. The number has changed over time. As of 1983, blue asbestos was considered ten times more dangerous than all other forms of asbestos to cause pleural mesotheliomas. Also, it was considered at the time to be "highly hazardous" given its lack of a threshold limit value. See S.S. Chissick and R. Derricott, editors, *Asbestos Properties Applications and Hazards, Volume 2*, New York: John Wiley & Sons, 1983, p. 269 and 291-292.

⁴⁸United States Environmental Protection Agency, "Draft Risk Evaluation for Asbestos Part 2: Supplemental Evaluation Including Legacy Uses and Associated Disposals of Asbestos," CASRN 1332-21-4. Public Release Draft, April 2024, p. 276. <https://www.epa.gov/assessing-and-managing-chemicals-under-tsca/risk-evaluation-asbestos-part-2-supplemental-evaluation>

⁴⁹ World Health Organization, Incem for Crocidolite Asbestos, ICSC, 1314 (November 2016).

mesothelioma cancer later in life. As stated by then Harvard Medical Professor L. Christine Oliver:

For malignant mesothelioma, exposure to asbestos for periods as short as one to several days have been associated with increased risk for disease... [The] EPA, a government agency charged with protecting the Public Health, must be diligent in its efforts to prevent even low level exposures in all settings – the home, the workplace, and the general environment.⁵⁰

For blue asbestos, a 2012 study of naturally occurring outcroppings in China showed that the mineral was dangerous even in small amounts.⁵¹

The well-established health hazards of asbestos are considerably more dangerous to children. As to activities on the beach such as children building sand castles, the United States government has long recognized that protections are critical for those children. As stated by the EPA in 1980:

Mesothelioma almost never occurs in people who have not been exposed to asbestos. It is always fatal...It seems likely that the dangers of asbestos exposure are particularly grave for children. Since they are exposed early in their lives, asbestos-induced cancers will have plenty of time to develop.⁵²

The EPA reiterated its specific concerns about any asbestos exposure to children in its risk evaluation as recently as April 2024.⁵³ In addition to the above, the Agency for Toxic Substances and Disease Registry (ATSDR), a division of the CDC, has raised the same concerns about the exposure of children to asbestos, noting that children breathe differently and have different lung

⁵⁰ L. Christine Oliver, “Letter to The Honorable Scott Pruitt, Administrator, U.S. Environmental Protection Agency,” March 10, 2017.

⁵¹ Binggan Wei, Linsheng Yang, Xiuwu Zhang, Biao Zhang, Jiangping Yu, and Xianjie Jia, “Airborne Crocidolite Asbestos Fibers in Indoor and Outdoor Air in a Rural Area,” *Aerosol and Air Quality Research*, 12: 1282-1288, p. 1285. <https://aaqr.org/articles/aaqr-11-08-0a-0121>

⁵² United States Environmental Protection Agency, “Toxic Information Series, Asbestos,” *Office of Pesticides and Toxic Substances TS-793*, Washington D.C., April 1980, p 2-3.

⁵³ United States Environmental Protection Agency, “Draft Risk Evaluation for Asbestos Part 2: Supplemental Evaluation Including Legacy Uses and Associated Disposals of Asbestos,” CASRN 1332-31-4. Public Release Draft. April 2024, p. 17. <https://www.epa.gov/assessing-and-managing-chemicals-under-tsca/risk-evaluation-asbestos-part-2-supplemental-evaluation>

structures than do adults.⁵⁴ This is the same agency that six years later simulated the construction of sand castles at IBSP without referencing the above concern, and declared the IBSP beach to be safe.⁵⁵

Blue Asbestos Fiber Mining in South Africa

The mines for blue asbestos in South Africa involve 250 miles from south of Prieska on the Orange River to the border of Botswana. The mines are also in the Pietersburg area in the Limpopo Province. After the first blue asbestos mines opened in 1893, the mining was dominated by a few companies, notably British-owned companies Cape Asbestos and Turner & Newall, along with Gefco and Swiss based Eternit with global operations⁵⁶ The demand for blue asbestos exploded with World War II as it, along with Amosite (brown asbestos), were preferred for use on ships.⁵⁷ As stated in the 1942 Minerals Yearbook, "...blue asbestos is regarded as essential because it is superior to other varieties in making asbestos-cement pressure pipes, chemical filters, and acid-resistant packings. Long blue fiber is used also in making gas masks."⁵⁸ The mines tragically were deadly towards the lower level employees such as the mixed ancestry, African, women, and children as safety, especially as that preventing the inhalation of the blue asbestos fibers was a low priority. Such conditions were known as early in the 1920s but were not substantially addressed until the 1980s with the emergence of the Black trade unions.⁵⁹

⁵⁴ ATSDR, "Public Health Statement of Asbestos," September 2001, p. 5.

<https://www.atsdr.cdc.gov/ToxProfiles/tp61-c1-b.pdf>

⁵⁵ Agency for Toxic Substances and Disease Registry, "Exposure Investigation Report: Illinois Beach State Park, Zion, Lake County, Illinois, EPA Facility ID: ILD984840140," *U.S. Department of Health and Human Services*, Atlanta; October 19, 2007, p. ii.

⁵⁶ Jock McCulloch, "Surviving blue asbestos: mining and occupational disease in South Africa and Australia," *Transformation Issue 65* (South Africa and Australia, 2007), p. 68-93, 71.

⁵⁷ *Ibid.*, 71.

⁵⁸ United States Department of the Interior, "Asbestos," *1942 Minerals Yearbook* (Washington D.C.: 1942), p. 1424. <https://search.library.wisc.edu/digital/APOA2SM44KGB3I8X/pages/AUNUCL6FR7D3Q78T>

⁵⁹ *Ibid.*, 79-80.

The risk of blue asbestos mining, along with environmental exposures, causing mesothelioma in South Africa was raised in February 1959 in a paper by Dr. JC Wagner, including that even trivial exposures could cause mesothelioma. The South African government responded by requesting that an asbestos industry funded survey be conducted. The survey was completed during February 1962 with an interim report showing an “alarmingly high” incidence of mesothelioma and a causal relationship to asbestos. However, the report was never finalized and was hidden from public view.⁶⁰

As is involved in this paper’s discussion concerning blue asbestos, 97% of the blue asbestos global output was mined in South Africa with most of the remaining amount mined in Wittenoom in Western Australia.⁶¹ Much of the blue asbestos imported into the United States, including that used at the Johns-Manville facility in Waukegan, Illinois, was incorporated into asbestos-cement pipe products.⁶² An excellent concise discussion on blue asbestos in South Africa is by Jock McCulloch, in his 2007 article titled “Surviving blue asbestos: mining and occupational disease in South Africa and Australia.”⁶³ McCulloch, who passed away in January 2018, was an extraordinary environmental health historian who specialized in, among other topics, blue asbestos from both South Africa and Australia. All stages of handling asbestos-containing ore in the mining and manufacturing processes, including shoveling, screening, loading, and unloading, can generate asbestos fibers into the environment.⁶⁴ The people of both

⁶⁰ McCulloch, p. 83-84.

⁶¹ McCulloch, p. 69. A small amount of blue asbestos was commercially mined in Bolivia and is known as Bolivian Blue. This asbestos was included in the Kent Cigarette filters in the 1950s.

⁶² Office of Toxic Substances, “Life Cycle”, p. 115.

⁶³ McCulloch, p. 68-93.

⁶⁴ Office of Toxic Substances, “Life Cycle.” p. 30.

South Africa and Western Australia who reside in the asbestos mining areas, suffer significant asbestos-related illnesses.

Johns-Manville History and its Use of Blue Asbestos in Waukegan

Johns-Manville was among the leading organizations in the United States importing blue asbestos fiber from South Africa. Johns-Manville was also one of the original and largest manufacturers of asbestos products in the world.⁶⁵ The corporation began with the 1858 founding in New York of a company named H. W. Johns Manufacturing Company and the 1886 founding in Wisconsin of Manville Covering Company. Those organizations merged during 1901 and renamed the surviving New York legal entity as “H.W. Johns-Manville Company.” The company was reincorporated in 1926 as “Johns-Manville Corporation.”⁶⁶ Although originally a private company, Johns-Manville went public in 1927 and joined the Dow Jones Industrials during 1930.⁶⁷ By April 3, 1939, Johns-Manville as a business was so well thought of that its president, Lewis Brown, was honored by Time Magazine as the public relations success of the year.⁶⁸ However, as asbestos transformed from being known as the magic mineral to giving rise to serious health concerns, Johns-Manville on August 26, 1982 filed for Chapter 11 bankruptcy protection. It emerged from bankruptcy on November 28, 1988, having shed many of its remaining obligations for legacy asbestos related hazards. A trust was set up to cover future asbestos-related product liability health claims. In 2001, Berkshire Hathaway acquired Johns-Manville and currently operates the company as a subsidiary.⁶⁹

⁶⁵ Johns-Manville Corporation, “Asbestos Johns-Manville,” 1925.

⁶⁶ JM Historical Timeline, Accessed April 4, 2023, <https://www.jm.com/en/our-company/HistoryandHeritage/company-history/>

⁶⁷Ibid. and W. Richard Goodwin, “The Johns-Manville Story,” New York; The Newcomen Society of North America, 1972, p. 9.

⁶⁸ Ibid., 9.

⁶⁹ JM Historical Timeline, Accessed April 4, 2023.

As of 1925, Johns-Manville had factories producing asbestos-containing product in Asbestos, Quebec; Cincinnati, Ohio; Gretna, Louisiana; Manville, New Jersey; Nashua, New Hampshire; Pittsburgh, California; and Waukegan, Illinois.⁷⁰ The manufacturing facility in Waukegan was a combination of three previously existing manufacturing plants that Johns-Manville wanted to consolidate, two in Milwaukee, Wisconsin, and one in Riverdale, Illinois. Construction began in 1919 and was completed in late 1923. The power house, paper mill, and the roofing plant began operations in 1922. Construction on the asbestos-containing (transite) pipe product line manufacturing building, the primary location for the blue asbestos, began in 1929, with approximately 56,000 square feet of floor space starting in 1930. The transite pipe building was eventually expanded to 139,000 square feet, as the needs of this business expanded.⁷¹ This was the oldest asbestos-containing pipe plant operated by Johns-Manville. Over the years, starting in the late 1940s, Johns-Manville installed a significant amount of equipment and undertook production changes in order to lower the dust count in the pipe plant.⁷² Asbestos-containing pipe was so popular that, as of 1980, over 200,000 miles of it was in use in the United States.⁷³

The Waukegan manufacturing facility was extensive and manufactured numerous products beginning in 1922 including various cements, magnesia blocks and pipe covering, aertite, asestoboard, asbestocel, millboard roll board, and much more. Of all those products, blue asbestos was used in the manufacture of only three products: all pressurized water pipes,

⁷⁰ Johns-Manville Corporation, "Asbestos Johns-Manville," 1925.

⁷¹ Johns-Manville, "Plant History," Memo (June 1, 1990), 7-8.

⁷² J. P. Kline, "Internal Correspondence," *Johns-Manville Corporation*. December 30, 1975.

⁷³ United States Environmental Protection Agency, "Ambient Water Quality Criteria for Asbestos," (Washington D.C.: Office of Water Regulations and Standards, October 1980), p. C-15.

some Flexboard, and 83-S and 84-S packing.⁷⁴ By 1951, Johns-Manville knew that they had a serious health concern arising from the asbestos generated in the Waukegan manufacturing facility. As stated by Arthur Vorwald, the-then Director of the Trudeau Foundation and the Saranac Laboratory, in his April 17, 1951, letter to J. Page Woodard of the Johns-Manville Corporation's headquarters in New York City, wrote "It is obvious that the situation in Waukegan is serious enough to warrant your most considered attention."⁷⁵ The letter continued by advising the Johns-Manville company to improve the plant condition before "irresponsible agents" pursue actions which would "reflect unfavorably on the industry."⁷⁶ This warning accurately predicted the issues which eventually caused the bankruptcy of Johns-Manville, and the reevaluation of asbestos being considered the magic mineral.

Johns-Manville primarily purchased blue asbestos from South Africa for use in its Waukegan manufacturing facility. A Johns-Manville September 11, 1974, purchase order to Cape Blue Mines includes 1,575 one hundred pound bags of blue asbestos for shipment to the Waukegan manufacturing facility.⁷⁷ Johns-Manville also addressed this issue in a 1989 response to discovery in a products liability lawsuit, in which Johns-Manville stated that its blue asbestos requirements were primarily imported from South Africa.⁷⁸ Two manufacturing specifications for transite pipe show 18% blue asbestos in the first specification and 10.9% blue asbestos in the

⁷⁴ Maggie Baumgardner, "February 7, 2024 Interview by Martin Ditkof," Original with Mr. Ditkof; Dennis Christianson, "February 29, 2024 Interview by Martin Ditkof," Original with Mr. Ditkof. Although Mr. Christianson did not recall blue asbestos in the 83-S and 84-S packings, the written specifications specifically identify blue asbestos within those products as recalled by Ms. Baumgardner.

⁷⁵ Arthur J. Vorwald, "Letter to Mr. J. Page Woodard," April 17, 1951.

⁷⁶ Ibid.

⁷⁷ Johns-Manville Corporation, "Purchase Order to Cape Blue Mines (Pty.), Ltd." (Location Unknown: September 11, 1974), p. 2. <https://www.toxicdocs.org/search?q=cape%20correspondence%20with%20Manville#>

⁷⁸ Johns-Manville Corporation, "Defendant Manville Corporation Asbestos Disease Compensation Fund's Response to Plaintiffs' Interrogatories," *Harry Dougherty and Grace Dougherty, In the United States District Court, for the District of Delaware*, November 21, 1989, p. 6.

second specification.⁷⁹ The waste products generated during the manufacturing process were disposed of in the waste pit adjacent to the manufacturing facilities. An October 1984 work-plan for the Johns-Manville Waste Disposal Site in Waukegan discusses the history as “The site is reported to have received asbestos-containing wastes. The wastes are primarily cuttings and waste products from the manufacturing of cement asbestos pipe and ashes containing roofing and insulating materials.”⁸⁰

Pathways for Asbestos Fibers to Migrate to the Park and Surrounding Area

The pathways for asbestos to reach the environment and the IBPS grounds from the 1920s to 1989 are extensive. These pathways include air flows, ground water, surface water, and human intervention. They include 600,000 tons of asbestos waste dumped either in the 60-foot asbestos waste pile or put with the sludge into the waste pit. The pathways also include natural flows of water from the Johns-Manville facilities down to the Lake Michigan shoreline. In addition, the asbestos waste was used by the community to build roads, build a berm, and otherwise help local residents. Asbestos fibers are known to travel distances in the air of between 25 to 50 miles once airborne.⁸¹ The pathways also include the use of replacement sand to help recover from beach erosion. As of 2007, the park requires 80,000 to 100,000 cubic yards of sand per year to prevent such erosion.⁸²

⁷⁹ Johns-Manville, “Manufacturing Specification, Waukegan Pipe 425-1, Transite Pipe, Fiber Blends & Standard Furnace Batch,” May 31, 1961 and Johns-Manville “Manufacturing Specification, Waukegan Pipe 425-1, Transite Pipe Fiber Blend,” January 4, 1978.

⁸⁰ Kumar Malhotra & Associates, “Work-Plan: Geotechnical and Hydrogeological Investigations, Johns-Manville Waste Disposal Site, Waukegan, Illinois,” Grand Rapids, MI: Revised October 1984, p. 6.

⁸¹ Ralph Sullivan and Yanis C. Athanasstadis of Litton Systems, Incorporated, “Preliminary Air Pollution Survey of Asbestos, A Literature Review,” *United States Department of Health, Education, and Welfare*, October 1969, p. 31.

⁸² Agency for Toxic Substances and Disease Registry, “Exposure Investigation Report: Illinois Beach State Park, Zion, Lake County, Illinois, EPA Facility ID: ILD984840140,” *U.S. Department of Health and Human Service*, Atlanta; October 19, 2007, p. i.

In 1982, the EPA published a comprehensive discussion on asbestos entitled “Life Cycle of Asbestos in Commercial and Industrial Use Including Estimates of Releases to Air, Water, and Land.”⁸³ The report included a section discussing the history and the then-current use of asbestos-containing pipe, including the following facts:

- (1) The estimated sales of this product from the Johns-Manville Waukegan facility during 1975 was \$15,000,000. This was approximately 8% of the sales total in the United States;
- (2) The average asbestos content was 18-20% for the pressure water pipes, of which the average blue fiber content was 16.7%. Hence, doing the math, the average blue fiber percentage content for the piping was just over 3%;
- (3) The pipe would corrode more quickly when delivering aggressive water (based on a formula incorporating the hardness and alkalinity) and, in those situations, would release a greater number of asbestos fibers;
- (4) The EPA analyzed the existing science on the amount of asbestos-containing waste released during the manufacturing process including admissions to air, in a waste pile, released to land, and released to water. The EPA cited a study that concluded that the plant waste piles posed a potential emissions hazard to nearby populations, although the emissions could not be quantified because of variations. The EPA felt that the other emissions pathways were relatively low.
- (5) The EPA summarized that “The potential for human exposure to asbestos from the manufacture and use of A/C pipe exists.” and “Existing sampling data are inadequate to draw accurate conclusions on the levels of asbestos in the general environment attributable to A/C pipe. More accurate data are needed ...”⁸⁴

Based on the above 1982 EPA report, significant waste from manufacturing asbestos-cement pressure water pipe, including blue asbestos, was to be expected. For the Waukegan facility, this waste was dumped in the waste pile, became sludge in the waste pit, or was provided to the community for use in berms, roads, and similar projects.

⁸³ GCA Corporation, “Life Cycle of Asbestos in Commercial and Industrial Use Including Estimates of Releases to Air, Water, and Land,” *U.S. Environmental Protection Agency* GCA-TR-79-73-G, Bedford, MA: February 1982, p. 115 – 131.

⁸⁴ *Ibid.*, 115-131.

An excellent example of the risk discussed in the above 1982 report is the August 23, 1983 draft report on the asbestos waste site associated with Johns-Manville's Waukegan facility.⁸⁵ The report involved on-site investigations and noted that broken pieces of the end product that contained blue asbestos, the asbestos-cement pipe, were seen in the waste dump near the lake shore. Further, a number of studies by governmental agencies exist that analyze the asbestos at the IBSP and the adjacent or nearby Lake Michigan shoreline. As an example, these studies include a Public Health Assessment undertaken by a division of the U.S. Department of Health and Human Services published on June 16, 2000. This report was, and remains, controversial as to the asbestos-related hazards arising from the asbestos-containing material at the lake shore.⁸⁶ The same agency has since produced a draft October 19, 2007 Health Consultation that was never finalized concerning the asbestos in that area. This draft Health Consultation downplays the asbestos health risks, stating::

“In late 1997, pieces of transite pipe, siding, and roofing materials suspected of containing asbestos were found scattered along the beach. In February 1998, the Illinois Department of Natural Resources collected bulk samples of the material and found they contained asbestos fibers.

ATSDR found that the simulated sand castle building did not result in air levels of asbestos greater than the reference stations inside the park boundary.

None of the airborne asbestos samples detected chrysotile, which is the predominant type of asbestos found in the asbestos containing debris washing up on the shore. Most of the asbestos detected was not the regulated varieties used or found in commercial products, i.e., chrysotile, amosite, crocidolite, and fibrous varieties of tremolite, actinolite and anthophyllite.

⁸⁵ Battelle and Dale Keyes, Consultant, “Draft Technical Report in Region V Re Asbestos waste site (Johns-Manville Corp.), Waukegan, IL, EPA Contract No. 68-01-6721,” Washington D.C.: August 23, 1983, p 7.

⁸⁶ Agency for Toxic Substances and Disease Registry, U.S. Department of Health and Human Services, “Public Health Assessment for Illinois Beach Park, Zion, Lake County, Illinois, Cerclis No. ILD984840140,” Springfield, VA: June 16, 2000.

The activities simulated at the beaches at IBSP pose no apparent public health hazard.”⁸⁷

Also, in 2000, an Illinois state government report identified the IBSP shore south of the parking area as a “hot spot” for finding asbestos-containing material along the beach, including pieces of water pipe. Further, the dredged sand trucked northward to supply the beaches included asbestos-containing material.⁸⁸ In spite of the above, the various governmental agencies have declared the grounds of IBSP safe from asbestos exposure. As stated by the Illinois Department of Natural Resources in May 23, 2007, draft management plan for asbestos:

As funding and other resources have become available, the State of Illinois has diligently addressed asbestos issues. Beginning in 1998 various State of Illinois agencies, the Attorney General’s Office, of the U.S. E.P.A. have conducted or funded, five separate studies to evaluate risks to IBSP visitors and employees... The State of Illinois , and the U.S. E.P.A. continue to work with the Agency for Toxic Substances and Disease Registry (ATSDR – an agency of the U.S. Center for Disease Control) to finalize a study evaluating risks from typical beach use activities. All of the completed studies have concluded, in one fashion or the other, there is little risk to human health.⁸⁹

The weaknesses and provisos in the above language are self-evident; the publication is rife with blaming funding availability, using undefined terms such as “little risk,” suggesting the need for additional study to be completed, and similar inexact language and ambiguity.

As discussed in “Agency Challenges CDC Study Calling Asbestos Safe” about this lakeshore area, not everyone agrees with the conclusion that IBSP is safe and, to be precise, some of the local residents believe that the government’s action were the equivalent of scientific

⁸⁷Agency for Toxic Substances and Disease Registry, “Exposure Investigation Report: Illinois Beach State Park, Zion, Lake County, Illinois, EPA Facility ID: ILD984840140,” *U.S. Department of Health and Human Services* Atlanta, October 19, 2007, p. i-iii.

⁸⁸ Michael J. Chrzastowski and Wayne T. Franke. “Guide to the geology of Illinois Beach State Park and the Zion Beach-Ridge Plain, Lake County, Illinois,” *Illinois Department of Natural Resources, Illinois State Geological Survey*, (Hathi Trust, 2000), p 39,42, and 56.

⁸⁹ Illinois Department of Natural Resources, “Draft Asbestos Management in Adeline Jay Geo-Karis Illinois Beach State Park (A Supplemental Management Plan),” May 23, 2007, p. 2.

fraud.⁹⁰ At least one local asbestos expert, Jeffrey Camplin, was extremely vocal about the problems.⁹¹ Of significant concern, the local non-profit organization charged with protecting the natural environment within IBSP, the Illinois Dunesland Preservation Society, chaired by coastal expert Paul Kakuris, strongly disagrees with the CDC analysis, and especially the science underlying that analysis. Mr. Kakuris and the society are extremely concerned about the health risks arising from the asbestos pieces and small, invisible, and inhalable asbestos fibers washing ashore from Lake Michigan onto the vulnerable and recreational park areas such as the nature preserve and beach. This issue is heightened when dealing with blue asbestos fiber exposure to children.

Mr. Kakuris is also concerned that the Illinois Department of Natural Resources owning both the marina, which it leases out to an operator, and being responsible for protecting the nature preserve, is an inherent conflict of interest which influences the decision making process. This is especially important given that Mr. Kakuris and others in the environmental scientific community have been excluded from certain meetings with the EPA and Illinois Department of Natural Resources when the asbestos issue is discussed. In summary, those voices, including the independent experts and dissenting scientific opinions, were excluded from that discourse.⁹² The July 26, 2005 response by an unidentified private citizen to the ATSDR's June 16, 2005 press release details the problems with the ATSDR's use of science in analyzing the asbestos risks.⁹³ The exclusion of these voices are especially concerning because of how the park is used by the

⁹⁰ Mesothelioma Aid, "Agency Challenges CDC Study Calling Asbestos Safe," n.d., <https://www.mesothelioma-aid.org/idps.htm>

⁹¹ Jeffrey C Camplin, "Lake Michigan Shoreline Asbestos Contamination Continues: Now Known as the New "Libby East,"" n.d., <https://illinoisdunesland.org/asbestos-exposure-risks.html>

⁹² Paul Kakuris, "Interview with Martin Ditkof," April 7, 2024 and April 24, 2024. Original with Mr. Ditkof.

⁹³ Unidentified Private Citizen, "CDC/ATSDR -- Illinois Beach Park Assessment: Request for a Correction," July 26, 2005, <https://aspe.hhs.gov/cdcatsdr-illinois-beach-park-assessment-request-correction-rfc>

community. In summary, those using the park should have a full understanding of the asbestos concerns.

The Park's Background and Community Usage

The justification to allow construction of a toxic waste dump next to a unique pristine shoreline of Lake Michigan befuddles the imagination, but times were different in the early 1920s. The state park is located at 1 Lake Front Drive, Zion, Illinois. It is 6.5 miles long and 0.5 miles wide right on Lake Michigan just north of the former Johns-Manville manufacturing facility that was in Waukegan, Illinois. The park, in addition to the recreation activities, is the home to diverse and rare fauna and flora. The southern part of the park includes natural dunes and swales, marshes, pine trees, two nature preserves, and oak tree forests. Children wander off the required paths to chase butterflies or to get a close up of bugs. Their faces are pressed towards the ground, inches from the plants, sand, or water spray, all of the time investigating what the park has to offer. With all of this in mind, the Illinois Department of Natural Resources has made the protection of this park, and especially the lakeshore, a long-term priority.⁹⁴

The north unit encompasses several old housing units dating back to the 1950s and is adjacent on the north to a state of the art, large marina also owned by the Illinois Department of Natural Resources. Some of the houses washed into Lake Michigan during a time of high water levels. The North Point Marina was built at this location during after IBSP acquired the land in the 1970s, with some of the leftover sand fill (including asbestos-containing material) piled immediately to the south of the marina.⁹⁵ The North Point Marina advertises bike trails, boating,

⁹⁴ Ibid., 1. Illinois Department of Natural Resources, "Draft Asbestos Management in Adeline Jay Geo-Karis Illinois Beach State Park (A Supplemental Management Plan)," May 23, 2007, p. 1.

⁹⁵ Ibid., 2. Michael J. Chrzastowski and Wayne T. Franke. "Guide to the geology of Illinois Beach State Park and the Zion Beach-Ridge Plain, Lake County, Illinois," *Illinois Department of Natural Resources, Illinois State Geological Survey*, (Hathi Trust, 2000), p. 1.

fishing, hiking trails, metal detecting, scuba diving, and swimming.⁹⁶ As both parts of IBSP and the marina are owned the Illinois DNR, and the marina is leased to a large marina operator, there are at times conflicts between the marina generating income and the need for the park's nature preserves, protected by both federal and state law, to remain pristine.

The south unit is immediately north of the Johns-Manville facility and waste pits and piles. It includes a fly ash and transite asbestos road remnant that is about 15 feet wide and extends 1,500 feet northeast into IBSP and the adjacent nature preserve. This road was confirmed to include asbestos-containing materials in 2000.⁹⁷ This asbestos is a possible result of waste disposal or a by-product of Johns-Manville's "largesse" as it donated off-specification material to residents and local governmental units for use of roadbed and fill. The road was constructed for fire suppression before the park was created. There is also a small section in the southeast corner of IBSP that remains from the asbestos disposal practices by Johns-Manville.⁹⁸

Science has not been a friend to issues arising from claimed asbestos exposure. In fact, science has long been disputed in the context of asbestos-related issues. This includes using the wrong chemical formula, the intentional misstatements or hiding evidence in order to maintain the salability of asbestos fibers and products without disclosing risks, analysis by litigation experts with a vested interest in the outcome, the EPA analyzing issues arising from Chrysotile fibers contaminated with amphibole fibers rather than without contamination, and similar problems.⁹⁹ As stated by Bruce Hover, a Master's of Science candidate in his 1986 thesis on

⁹⁶ Ibid.; Illinois Department of Natural Resources, "Draft Asbestos Management in Adeline Jay Geo-Karis Illinois Beach State Park (A Supplemental Management Plan)," May 23, 2007, p. 1.

⁹⁷ Ibid., 2.

⁹⁸ Illinois Department of Natural Resources, "Draft Asbestos Management in Adeline Jay Geo-Karis Illinois Beach State Park (A Supplemental Management Plan)," May 23, 2007, p. 1-2 and 6.

⁹⁹ Many of these issues can be found at Martin L. Ditkof, "The Disappearing Blog on Chrysotile Asbestos," March 5, 2021. <https://theasbestosblog.com/?p=2052>

asbestos, “If there is a battle over the dangers of asbestos in ambient air then there is a war over the dangers to asbestos in food or water.”¹⁰⁰ Mr. Hover recognized that, as of 1986, the dangers of asbestos exposure arising from asbestos-cement pipe was well known to the EPA; his thesis stating, “In a swift move the EPA proposed a ban on asbestos-cement and four other common asbestos products.”¹⁰¹ The above scientific issues compound the ambiguity and disagreements when analyzing asbestos exposure related issues.

As to asbestos remediation in the park, an initial survey in 1999 showed asbestos-containing material on the IBSP beaches. Johns-Manville removed visible surface transite asbestos from the road in approximately 2000. In addition, the Illinois Department of Natural Resources and the EPA committed to perform a surface removal of transite asbestos once a year.¹⁰² This does not include digging because the road is within a strictly controlled nature preserve. The Illinois Department of Natural Resources did recognize that additional asbestos-containing material would likely be exposed in the future through natural processes. In fact, their beach inspections routinely discover and remove small pieces of asbestos on the lakeshore beaches. The Illinois Department of Natural Resource states that it has committed to performing other surface removal of visible transite in conjunction with their other land management duties.¹⁰³

¹⁰⁰ Bruce J. Hover.. “Asbestos: A Consumer Fact File.” M.S. Thesis, Oklahoma State University, December 1986, 1935. (Author has a copy).

¹⁰¹ Illinois Department of Natural Resources, “Draft Asbestos Management in Adeline Jay Geo-Karis Illinois Beach State Park (A Supplemental Management Plan),” May 23, 2007, p. 35-36.

¹⁰² Mr. Kakuris claims that the government agencies have not picked up the asbestos pieces for years, no longer provide information brochures, and that the warning signs are now faded and illegible. “Comments” by Mr. Kakuris, April 28, 2024. p. 28, 32. Original with Mr. Ditkof. The lack of follow through by the governmental agencies on completing the Health Consultation and undertaking the recommended asbestos-safety good practices puts the public at risk to inadvertent contact to the asbestos fibers and pieces.

¹⁰³ Ibid., 3 and 6.

In addition to the above activities, the Illinois Department of Natural Resources was to provide a public awareness program focused on its efforts concerning the IBSP asbestos. This was to include information kiosks at park access locations and near the major facilities, and informational brochures in the park office.¹⁰⁴ However, the Department does not take the risks associated with blue asbestos seriously. Rather, its position is as follows:

Though ACM [asbestos-containing material] is known to be present on the beaches and in inland areas of IBSP, there are not large volumes of ACM and all the risk assessments and health studies determined that there is little risk to the health of park workers or visitors. Further, no regulatory standards exist to establish safe levels of asbestos in soils or sand. State and federal health agencies have studied or assessed the risk to human health at IBSP and in all instances determined that predicted risk levels are low.¹⁰⁵

The Department does not define what it means by a “low” risk in that 2007 publication, but the EPA did explain in 2012 that of the 201 air samples taken during the monitor activity based testing, 13 contained quantifiable levels of asbestos fibers.¹⁰⁶ The EPA acknowledged in its 2012 document that hand removal of asbestos products from the beach and educating the public about the hazards of asbestos should continue by the Illinois Department of Natural Resources. The EPA document discusses that in 2007, the Illinois Department of Natural Resources removed 8,000 tons of asbestos contaminated sand from the feeder beach at the North Point Marina.¹⁰⁷ Keeping the above facts in mind, low exposure to asbestos fibers does not mean no exposure. As such, workers and visitors, including children, are likely still being exposed to asbestos fibers as the material washes up on the beach and into the nature preserve area. Of course, as the 2012

¹⁰⁴ Ibid, 11.

¹⁰⁵ Ibid., 12.

¹⁰⁶ Matthew J. Ohl, “Enforcement Action Memorandum to Richard C. Karl, Director Superfund Division,” *United States Environmental Protection Agency*, November 30, 2012, p. 14. Document 446478. Also, the 23 microvac and 61 soil samples did not detect any asbestos fibers. The documents do not discuss the type of asbestos fibers found in the samples.

¹⁰⁷ Ibid.

EPA document recommends that the asbestos removal from the beach is “non-time critical,” determining the amount and timing of such exposure to those at IBSP is difficult.¹⁰⁸

Testing

Table 1 in Appendix A identifies the sample testing discovered during the research for this paper that is relevant to whether blue asbestos fibers are at, or in the vicinity of, IBSP. This testing included identifying blue asbestos wastes that were disposed of onsite by Johns-Manville between its initiation of its manufacturing operations during 1922 and its phase out of using asbestos during 1989.¹⁰⁹ Table 1 shows testing positive for blue asbestos either on or near IBSP on six occasions since 1990: These dates were in 1990, 1998, 2002, 2023, 2995, and 2008.

Much of the push back against the sampling procedures and the government interpretation of the test results as being safe rely upon the work of noted asbestos expert Jeffery Camplin. Mr. Camplin has provided numerous comments to the EPA, the Illinois Department of Natural Resources, the Illinois Attorney General’s Office, the CDC/ATSDR, and others involved in IBSP asbestos-related issues.¹¹⁰ His criticisms of the government testing and handling IBSP are both substantive and procedural, although each issue eventually focuses on the continued and existing risks to families using IBSP. The substantive issues are as follow:

1. At least six separate sample testing results have been positive for blue asbestos fibers and the government agencies have done nothing to address the health risks that they and other government agencies, such as the World Health Organization and the European Union, identify and warn against in other publications as involving exposures either to adults or children;

¹⁰⁸ Ibid., 1.

¹⁰⁹ Gene A Lucero, Director, Office of Waste Programs Enforcement, “Authorization to Proceed with Remedial Investigation / Feasibility Study at the Johns-Manville site, Waukegan, Illinois.” p. 2. Document No. 137668.

¹¹⁰ As to his background, among other accomplishments, Mr. Camplin has provided in-person testimony to Congress in 2009, spoken at the World Asbestos Conference in Sicily during May 2009, and has his 2010 presentation to the Asbestos Disease Awareness Organization on YouTube.

2. The EPA Region V office when it was initially involved in the asbestos-related investigation, did not understand the science. In particular, its flawed use of ACM (at least 1% asbestos) as minimum criteria for being safe was in error. As recognized by good industrial hygiene practices and the EPA home office, asbestos content of less than 1% may still be extremely dangerous.¹¹¹ As such, the presence of asbestos fibers, including the blue asbestos fibers, was potentially undercounted. This is critical as blue asbestos fibers are heavier than white asbestos. As such, blue asbestos fibers are more likely to settle in the sand than to leave the area through air currents;
3. The EPA has taken the position that all asbestos fibers are of equal potency in making their decisions about the health hazards at IBSP.¹¹² By ignoring the majority view of the science, even as late as 2008, the EPA was unnecessarily opening up the area residents and workers to illness and potential death without making an attempt to fully look at or understand the literature and science. In summary, they cherry picked a minority position in an attempt to support their predetermined conclusion. As of 2007 with the South African study, the overwhelming science recognized blue asbestos as extremely dangerous in comparison to the other asbestos fibers; and¹¹³
4. The EPA Sixth Five-Year Plan for the Johns-Manville Superfund site issued on April 27, 2023, now excludes coverage for the Illinois Beach Nature Preserve and the Nature Preserve Road, stating that the State Removal Action is complete for the preserve and is in development for the road.¹¹⁴ As such, no current action plans exist for these locations.

The procedural issues are as follows: The testing methodology is flawed in that it allows for microscopic asbestos fibers to be diluted, including potentially to a level below the analytic detection level; second, the laboratory methods selected to determine the presence of asbestos fibers utilized a minimum detection level of 2,500% higher than appropriate, thereby excluding asbestos fibers and their potential support to develop a professional cleanup plan; third, the draft clean-up plan is not site specific. As an example, no testing was undertaken to determine the presence of blue asbestos fibers under the anticipated circumstances found at the various sub-

¹¹¹ Micheal B. Cook, "Memorandum: Clarifying Cleanup Goals and Identification of New Assessment Tools for Evaluating Asbestos at Superfund Cleanups," August 10, 2004, p. 1. Document 437056.

¹¹² Arnold Den, Jim Konz, and Mark Maddaloni, "Transmittal Memorandum: Draft ATSDR Health Consultation based on the 2007 ERT Illinois Beach State Park Sampling (Health Consultation) to Mark Johnson, ATSDR," (July 22, 2008), p. 4.

¹¹³ Neil White, Gill Nelson, and Jill Murray, "South African experience with asbestos related environmental mesothelioma: Is asbestos fiber type important."

¹¹⁴ United States Environmental Protection Agency, "Sixth Five-Year Review Report for Johns-Manville Corp. Superfund Site, Lake County, Illinois," April 27, 2023, Table 1.

conditions of IBSP beach, nature preserves forests, and coastal activities (such as waves and shore locations, marinas, and the such); fourth, the sampling methodology was flawed as it did not take into account wind conditions, realistic beach activity, lung differences between adults and children, and similar criteria. The accuracy of criteria is critical to prevent the undercounting of asbestos fibers; and fifth, the collection of asbestos-containing products did not differ between those known to have blue asbestos versus white asbestos. As blue asbestos was known to be located at the Johns-Manville facility and in its outdoor waste pile and waste pit, the failure to account for the differences among fiber types provides a significant diminution of the actual risk from the asbestos fibers that are either inhaled or ingested. As such, any clean-up plan is inherently flawed.

Mr. Camplin presented many of these issues to the various governmental agencies on a number of occasions, including providing details in his March 12, 2012 letter to Mike Joyce of the EPA, all without a substantive governmental response to the issues and concerns that he raises. Similar to the EPA's August 1, 1984 response to Tom Gockel, Camplin's comments have been received with, an in essence, a "pound sand" response.

Conclusions and Recommendations

Based on the science, facts, and history as discussed above, at best, the IBSP location exposure arising from asbestos, especially blue asbestos, is unknown. The testing by government agencies shows the presence of this fiber, but fails to provide any analysis of the exposure other than to indicate in general terms that they believe the asbestos at IBSP to be safe. At worst, the blue asbestos fibers may have caused serious illness and potentially death in that geological area for many years, all without the knowledge of local residents and park workers. Under this scenario, for those who have already breathed in the fibers, their future sickness is now painfully

fait accompli. In all likelihood, the truth is likely somewhere in between the best and worst scenarios. To protect those who have not yet inhaled or ingested the fibers, the answer is easy: more precise testing, less exposure, and better communication undertaken with a spirit of transparency.

Although this particular set of facts is unique to IBSP, the balance of social and economic priorities, in paradox to the potential health hazards arising from asbestos exposure, plays out in the world on a daily basis.¹¹⁵ This includes, among other exposures, in mines, in manufacturing and construction, exposing first responders, and during shipbreaking activities taking place on beaches. Those people making the decisions need to consider the damages to those who have little to no voice or, as we have seen in the past, they risk passing the issues down from generation to generation. In an important way, the issues to be addressed involving IBSP are a microcosm of societal needs when land and resources are scarce.

For those near IBSP, whether charter boat owner Tom Gockel in 1984, asbestos expert Jeffrey Camplin on a number of occasions, Paul Kakuris speaking for the Illinois Dunesland Preservation Society and who has taken the point position on keeping the asbestos issues at IBSP in the public eye, or other people who live, work or play near IBSP, they need to have their voices heard and considered upon full disclosure of the risks to all concerned, and considered in this paradox of safety versus community recreation and economic needs. The government agencies should not ignore the message merely because they do not like it or disagree with what

¹¹⁵ Libby, Montana; Turin, Italy; Wittenoom, Australia; asbestos exposure to shipbreaking laborers in the Global South; and the first responders asbestos caused injuries arising from the collapse of the World Trade Centers on September 11, 2001, are five additional examples in which the paradox between asbestos health calamities and other societal needs are well known, each of which resulting in significant regulatory, civil, or criminal lawsuits.

it means. Based on the facts discussed above, the government agencies have failed in that responsibility. They still have the opportunity to make amends.

Of course, if the EPA had listened and acted upon the request of Tom Gockel in 1984, Johns-Manville solely would have been responsible for the clean-up costs arising from its conduct. Instead, the people living and recreating near IBSP potentially pay the price in their long term health risks along with a likely significant share of the direct and indirect ancillary expenses. However, precisely determining those amounts is for another day.

Appendix A

Table 1

(Sampling which the report specifically shows blue asbestos are listed below. Those samples that just showed amphibole asbestos fibers without additional details are not included.¹¹⁶)

| Date | Sample Location | Organization taking samples | Summary of results concerning asbestos |
|----------------------|--------------------------------------|--|---|
| February 7, 1990 | JM Waukegan and area | Randolph for USEPA, IL EPA, and Manville (CRA) | 12 Samples. Many testing positive for blue asbestos fibers ¹¹⁷ |
| March 3, 1998 | IBSP and area | Hanson Engineers, for the Illinois Department of Natural Resources | Crocidolite in 4 of the 5 listed samples, including at the North Point Marina and the Nature Preserve Beach. ¹¹⁸ Hanson issued a May 1998 report. ¹¹⁹ The U.S. Department of Health and Human Services issued an October 19, 2007 report which discussed these samples. |
| March 7, 2002 Report | JM Waukegan, beach, nearby locations | Aeolus, Inc for the Waukegan Park District. Doc 259724 ¹²⁰ | For a proposed sports complex. Page 5-5, bulk asbestos sampling, 13 of 24 samples from offsite contain blue asbestos fibers. 3 of 4 from onsite had blue asbestos fibers. |
| May 29, 2003 | IBSP and area | Matt Cookingham for IL EPA, lab used was UAS | 6 samples taken during inspection: 2 negative, 3 Chrysotile, 1 both Crocidolite and Chrysotile. Transite pipe was visible. ¹²¹ |
| June 6, 2005 | IBSP and nearby areas | EMS and UAS for the U of Illinois at Chicago's School of Public Health | Table A-2 shows one sample with Crocidolite asbestos fibers on the IBSP grounds. Table B-3 shows significant sampling with Crocidolite fibers including |

¹¹⁶ An example of excluded sampling are the results discussed on page 31 of the EPA Interim Report (date unknown) that showed amphibole fibers in the samples from both the IBSP North and South beach areas, along with the lake-bottom sand collected in the North Point Marina and the Approach Channel to the Waukegan Harbor, but did not specifically identify them as crocidolite. United States Environmental Protection Agency, "Sampling Results and Discussion: Interim report," n.d. p. 31.

¹¹⁷ Brad Bradley, "Letter and sampling results," *United States Environmental Protection Agency*, April 11, 1990. Document Nos. 137853 and 6.

¹¹⁸ United States Department of Health and Human Services, "Health Consultation," p. 12, 18, and 33.

¹¹⁹ Hanson Engineers, Incorporated, "Sampling for Asbestos Materials Oversight of Asbestos Removal Activities Illinois Beach State Park," *Prepared for Illinois Department of Natural Resources*, May 1998, p. 5-2, 5-10, and 6-1.

¹²⁰ Aeolus, Inc, "Waukegan Park District: An Evaluation of Offsite Asbestos and Air Pollutants and Their Potential Effect on Visitors to the Proposed Sports Complex in Waukegan, Illinois," *The Waukegan Park District. Final Report- March 7, 2002*, p. 5.5-7 Document N. 259724.

¹²¹ Chris Kallis, "Inspection Notes: Johns-Manville," May 29, 2003.

| | | | |
|-------------|----------------------------|--------------------------------------|---|
| | | | on IBSP grounds. This chart shows (1) the Crocidolite fibers spreading from IBSP to the other Lake Michigan beaches and (2) that IBSP has a significantly statistical higher amount of Crocidolite than do surrounding beaches, per Mr. Camplin. ¹²² |
| Feb 7, 2008 | JM Waukegan S.W. site area | EMSL Analytical, Inc. for LFR, Inc.. | Two of fifteen samples showed Crocidolite asbestos. ¹²³ |

¹²² University of Illinois at Chicago's School of Public Health, "Appendix A and B," Table A-2 and B-3, 2005.

¹²³ EMSL Analytical, Inc., "PLM Analysis of Bulk Samples for Asbestos," March 26, 2008 and April 10, 2008.

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