SILICA LIABILITY

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Introduction

Since the early 20th-century the health risks associated with silicosis have been well documented. Public awareness intensified after the so-called Hawk’s Nest Incident, widely regarded as one of America’s worst industrial disasters, which occurred in Gauley Bridge, West Virginia in the 1930’s. More than 1,000 workers are believed to have died after contracting acute silicosis due to silica exposure during the construction of a new hydroelectric power plant there. Almost no precautions were taken against inhalation of silica as the workers tunneled through a mountain with a very high concentration of silica. Since then, safety measures have improved, but while the number of deaths associated with silicosis continues to decline, the number of silica claims being filed is increasing sharply.

As Congress continues to debate a national solution to the asbestos litigation crisis, new personal injury claims are being filed on behalf of individuals suffering from occupational lung disease caused by exposure to silica. There is already awareness of silicosis as a health problem at high levels of government. In the midst of a June 2003 Senate Judiciary Committee hearing on asbestos litigation reform, Senator Patrick Leahy, the ranking Democratic member of the committee, referred to his two grandfathers who had worked as stonecutters in the granite quarries of Vermont. Both suffered from silicosis because of their workplace exposures to stone dust, and one of them had died at the age of 35 because of the disease. Senator Leahy said: “Thinking of them, and of the hundreds of thousands of present and future asbestos victims, I want to make every effort to solve this crisis.”

What is Silica?

Silica refers to the chemical compound silicon dioxide (SiO₂) and occurs in a crystalline or noncrystalline form. Crystalline silica, also known as quartz, is the second most common mineral in the earth’s crust after the gemstone feldspar, and is a major component of soil, sand, rock and many other minerals (Exhibit 1). When workers chip, cut, drill or grind objects that contain quartz, respirable size particles may be produced. Overexposure to respirable crystalline silica can cause a disabling and sometimes fatal lung disease called silicosis.
Workers in many occupations and industries are potentially exposed to quartz dust. According to the National Institute for Occupational Safety and Health (NIOSH) and the Department of Labor (DOL), currently at least 1.7 million U.S. workers are exposed to crystalline silica and each year more than 250 of them die with silicosis. There is no cure for the disease, but it is highly preventable. Inhalation of crystalline silica particles has also been associated with other diseases, such as bronchitis, tuberculosis, autoimmune diseases\(^1\), nephrotoxicity\(^2\) (state of being toxic to the kidney cells) and fibrosis (scarring) of the lung. In addition, some studies indicate an association with lung cancer. Silicosis and related diseases can also be contracted through overexposure to kaolin, a clay-like form of silica.

Any dusty environment where crystalline silica is present can potentially increase the likelihood of developing silicosis. Typical sand found at the beach does not pose a silicosis threat, however. According to the NIOSH and DOL, the following industries and activities pose the greatest potential exposure threat for workers (Exhibit 2):

- construction (sandblasting, rock drilling, masonry work, jack hammering, tunneling)
- mining (cutting or drilling through sandstone and granite)
- foundry work (grinding, moldings, shakeout, core room)
- stone cutting (sawing, abrasive blasting, chipping, grinding)
- glass manufacturing
- agriculture (dusty conditions from disturbing the soil, such as plowing or harvesting)
- shipbuilding (abrasive blasting)
- ceramics, clay, and pottery

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\(^1\) Some studies show excess numbers of cases of scleroderma (an autoimmune disorder manifested by scarring of the skin or internal organs) and other connective tissue disorders in workers exposed to respirable crystalline silica.

\(^2\) An increased incidence of chronic kidney diseases and end-stage renal disease in workers exposed to respirable crystalline silica has been cited in several studies.
• railroad (setting and laying track)
• manufacturing of soaps and detergents
• manufacturing and use of abrasives

The NIOSH and DOL currently estimate that more than 100,000 workers in the U.S. are at high risk of developing silicosis through sandblasting, rock drilling and mining. The Occupational Safety and Health Administration (OSHA) states that the most severe exposures generally occur during abrasive blasting with sand to remove paint and rust from bridges, tanks, concrete structures, and other surfaces. Other construction activities that OSHA cautions can result in severe exposure include: jack hammering, rock/well drilling, concrete mixing, concrete drilling, brick and concrete block cutting and sawing, tuck pointing (finishing of joints along center lines with putty or mortar) and tunneling operations.

A June 2004 report by Credit Suisse First Boston3 (CSFB) estimates that nearly one third, or 1.2 million of 4.4 million workers in the mining and non-mining industries in the U.S. are potentially exposed to silica dust (Exhibit 3). CSFB’s estimate is based on a 1986 study from the National Institute of Occupational Safety and Health (NIOSH) and 2002 U.S. Department of Labor figures. All 556,800 workers in the mining industries are potentially exposed, according to CSFB’s analysis.

Government agencies recommend the use of engineering controls, work practices to control dust exposures, respiratory protection and air monitoring to reduce hazards to workers during activities such as sandblasting. OSHA has established a Permissible Exposure Limit (PEL) which is the maximum amount of crystalline silica to which workers may be exposed during an eight-hour shift. It also requires hazard communication training for workers exposed to crystalline silica and a respirator protection program that requires a respirator to be selected based on the exposure levels. Despite these measures, many workers across the U.S. continue to be exposed to silica in excess of the recommended levels. U.S. corporations appear to be increasingly exposed to the potential for silica-related claims, as discussed later in this report.

**Silicosis: The Disease**

Silicosis is a disabling, nonreversible and sometimes fatal lung disease caused by overexposure to respirable crystalline silica. Overexposure to dust that contains microscopic particles of crystalline silica can cause scar tissue to form in the lungs, which reduces the lungs’ ability to extract oxygen from the air. The NIOSH and DOL identify three types of silicosis, which depend on the concentration of crystalline silica to which a worker has been exposed (Exhibit 4). These are:

- **Chronic silicosis** – usually occurs after 10 or more years of overexposure at relatively low concentrations

- **Accelerated silicosis** - results from higher exposures and develops over five to 10 years

- **Acute silicosis** - occurs after exposure to high concentrations and can cause symptoms to develop within a few weeks or up to five years

Chronic silicosis, the most common form of the disease, may go undetected for years in the early stages. The NIOSH notes that it may take 15 or 20 years after the initial exposure to silica dust for a chest X-ray to reveal an abnormality. Symptoms of the illness include: shortness of breath; severe cough; fatigue; loss of appetite; chest pains and fever.

**Mortality Rates**

Deaths associated with silicosis have been declining steadily. According to a report released in May 2003 by the Department of Health and Human Services and the Centers for Disease Control and Prevention (CDC)\(^4\), between 1990 and 1999 there were a total of 2,405 silicosis deaths among U.S. residents age 15 and over. Of these, some 82 percent occurred among people age 65 or greater (Exhibit 5). Silicosis mortality has declined from well over 1,000 deaths annually in the late 1960s to fewer than 200 per year in the late 1990s; in 1999, there were 187 silicosis-related deaths. Silicosis was designated as the primary cause of death in 55 percent of all deaths involving silicosis in this period and

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a contributory factor in the remaining 45 percent (Exhibit 6). According to the CDC, Pennsylvania alone accounts for nearly 18 percent of silicosis deaths for the 1990-1999 period, ranking first among states in terms of number of silicosis deaths and fourth in age-adjusted silicosis mortality rate (Exhibits 7 & 8). The statistics also show that West Virginia had the highest age-adjusted death rate in the nation from silicosis (4.23 per million population), while Hawaii had the lowest (no reported deaths) (Exhibit 9). The overall U.S. mortality rate from silicosis for that period was 1.21 deaths per million population. This compares with a national death rate from asbestosis of 5.41 deaths per million population in the same period. Delaware had the highest death rate in the nation from asbestosis (20.63 per million population), while South Dakota had the lowest (0.60 per million population) (Exhibit 10). Silicosis also ranks fourth in terms of age-adjusted mortality rate from 1990 to 1999 when compared to selected work-related lung diseases included in the same report (Exhibit 11).

Earlier statistics from the CDC make for interesting comparisons. During 1968 to 1994 a total of 14,824 silicosis-associated deaths were recorded in the U.S. Of these, some 76 percent occurred among people aged 65 or greater, while 23 percent occurred among the 45-64 year age group, and 1.4 percent among those aged 15 to 44. Overall, silicosis deaths declined substantially from 1,157 in 1968 to less than 400 annually after 1980. However, the number of silicosis-related deaths among young people (15 to 44 years) did not decline substantially between 1968 and 1994, accounting for 207 of the 14,824 deaths during that period.

Analysis of Mortality by Industry and Occupation

As previously noted, a wide range of industries and employees are potentially exposed to silicosis. According to provisional data from three states (Michigan, New Jersey and Ohio) and reported under the Sentinel Event Notification System for Occupational Risks (SENSOR) program as of September 2002, from 1989 to 1998, silica cases originated mostly in manufacturing industries (87.5 percent), construction (5.9 percent) and mining (5 percent). Operators, fabricators and laborers accounted for the majority of cases (65.1 percent) (Exhibits 12 & 13). Insurers who wrote various types of liability insurance policies as well as workers compensation policies are also potentially exposed.
National Center for Health Statistics data on silicosis mortality by industry shows that between 1990 and 1999 the industries most frequently recorded on death certificates for silicosis in U.S. residents aged 15 and over, are construction, metal mining and coal mining (Exhibit 14). Construction accounted for 118 deaths, or 13.4 percent of the total; metal mining for 86 deaths, or 9.8 percent of the total; and coal mining for 69 deaths, or 7.8 percent of the total. All other industries accounted for 317 deaths, or 36 percent of the total. According to the CDC, compared to asbestosis, coal workers’ pneumoconiosis (CWP) and byssinosis (a respiratory disease caused by long-term inhalation of cotton dust), silicosis mortality appears to be somewhat less concentrated by industry or by geographic region.

In terms of occupation, the most frequently recorded occupations on death certificates for silicosis over the same period include mining machine operators with 138 deaths, or 15.7 percent of the total, followed by laborers (excluding construction) with 84 deaths, or 9.6 percent of the total (Exhibit 15). Proportionate mortality ratios (PMRs) associating silicosis deaths with various occupations reveal that workers in miscellaneous metal and plastic processing, hand molding and forming, crushing and grinding machine operators and mining occupations had the highest PMRs for silicosis mortality (Exhibit 16). The statistics also indicate that significantly elevated silicosis mortality in the miscellaneous non-metallic mineral and stone products, iron and steel foundries, and structural clay products industries was accompanied by quartz dust levels in those same industries that frequently exceeded the permissible or recommended exposure limits.

Cancer Link

While mortality rates are down for silicosis, U.S. and international health agencies remain concerned about the continuing occurrence of silicosis and silica-related diseases. In 1997 the International Agency for Research on Cancer (IARC) reviewed a series of epidemiological studies on the potential causal relations between silica and cancer risk. It concluded that there is sufficient evidence in humans for the carcinogenicity of inhaled crystalline silica in the form of quartz or cristobalite from occupational sources. In making its overall evaluation, however, the group noted that carcinogenicity in humans was not detected in all industrial circumstances studied. “Carcinogenicity may be
dependent on inherent characteristics of the crystalline silica or on external factors affecting its biological activity or distribution of its polymorphs,” the IARC concluded.

The American Thoracic Society (ATS) in the same year adopted an official statement that described the adverse health effects of exposure to crystalline silica including lung cancer. “The available data support the conclusion that silicosis produces increased risk for bronchogenic carcinoma,” the ATS said. However, it went on to note that less information was available for silicosis-sufferers who had never smoked and for silica-exposed workers who do not have silicosis. “For workers with silicosis, the risks for lung cancer are relatively high and consistent among various countries and investigators. Silicosis should be considered a condition that predisposes workers to an increased risk of lung cancer,” it added.

After reviewing these studies, in 1989 the NIOSH recommended that crystalline silica be considered a potential occupational carcinogen.

More recently, in 2000, the National Toxicology Program Report on Carcinogens (RoC), changed its categorization of silica to “known to be a human carcinogen”, from its previous level as “reasonably anticipated to be a human carcinogen”. The biennial report, mandated by the Public Health Services Act, publishes a list of all substances that either are known to be or may reasonably be anticipated to be human carcinogens, and to which a significant number of U.S. residents are exposed. The latest report5, published in December 2002, states that the link between human lung cancer and exposure to respirable crystalline silica (RCS) is strongest in studies of quarry and granite workers, and workers involved in ceramic, pottery, refractory brick and diatomaceous earth industries.

**Safety Information on Silica Products**

There is a substantial amount of publicly-available safety information about the types of diseases that can arise from exposure to silica. Data regarding health and safety of silica-related products, their appropriate use and protection of workers is available from OSHA

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and NIOSH⁶. Both agencies provide details on applicable standards for working with crystalline silica, hazard recognition, high risk occupations, possible solutions for workplace hazards, prevention of silicosis and deaths in workers, as well as related health and safety topics.

Some companies that sell silica-related products also provide detailed information about the hazards associated with their use. For example, U.S. Silica provides extensive safety data information about its products, including chemical composition and recommended exposure limits, hazards identification, potential health effects, first aid measures, handling and storage, exposure controls/personal protection, physical and chemical properties, toxicological information, disposal considerations and regulatory information.

**Rising Litigation**

While deaths from silicosis are declining, it appears that silica-related claims are on the rise. For example, U.S. Silica, a large producer of industrial sand headquartered in West Virginia, is facing more than 22,000 silica claims. In 2003, the number of plaintiffs naming the company in lawsuits was three times what it was in 2002. U.S. Silica reports that it had 15,342 new claims filed against it through June 30, 2003, up from around 5,152 for the full year 2002, and 1,371 in 2001 (Exhibit 17). Of the lawsuits filed against the company, most are from the states of Mississippi and Texas, which have long been favored as jurisdictions within which to initiate litigation.

An increase in silica-related claims has been reported by several other U.S. corporations. For example, Houston-headquartered Halliburton Company has a pending $4.2 billion agreement that would settle about 21,000 silica personal injury claims, in addition to 400,000 asbestos claims. Minnesota-based 3M Corporation is another company that has publicly acknowledged its exposure. In its May 2003 quarterly filing with the Securities and Exchange Commission (SEC), 3M said it was facing lawsuits involving approximately 54,000 individual claimants. It revised upward its estimate of probable liabilities and associated expenses for respirator mask/asbestos litigation, citing an increase experienced in the number and proportion of silica-related claims. “The company expects an increase in the number of future claims as claimants attempt to file

claims before the effective date of anticipated tort reform legislation and significant defense spending as the company continues to aggressively manage this litigation,” it noted. As a result of these developments, 3M said it increased its accrued liabilities by $100 million, to $231 million, at the end of the first quarter of 2003. The company added that it made a corresponding increase of $94 million in receivables for the probable amount of insurance recoveries to $357 million. By combining the U.S. Silica and 3M claims, the total number of silica claimants is now estimated at over 70,000.

According to the Coalition for Litigation Justice (CLJ), one large insurer has seen silica claims rise tenfold since August 2002. It reports that the insurer is facing cases brought by more than 25,000 claimants in 28 states (individuals who have brought lawsuits against one or more of the company’s policyholders). Of the nearly 30,000 plaintiffs, some 66 percent are from Mississippi, and 25 percent from Texas. In fact, Mississippi has the highest number of silica plaintiffs, with more than 17,000 filing lawsuits in that state. The CLJ also reports that hundreds of silica claimants have filed lawsuits in Texas to beat the deadline for new civil justice reforms recently passed in that state. There are also claims pending in two dozen other states.

Cases To-Date

An October 2003 report published by General Reinsurance Corporation points out that silica-related suits are targeting a variety of defendants (Exhibit 18), including:

- Suppliers of silica sand and other silica-containing products.
- Manufacturers of protective gear.
- Manufacturers or equipment and/or machinery used in the sandblasting, grinding or other processes involving silica (eg. filter and respirator manufacturers).

Widely recognized as one of the most significant silica cases to-date is a $7.5 million award in Texas, affirmed in November 2002, to the widow and estate of a former sandblaster against U.S. Silica. The jury found that the sandblaster’s silicosis was caused by exposure to products manufactured by the company or its predecessors, and that the products had failed to warn of the danger of silica exposure. The plaintiff was exposed to

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U.S. Silica sand from 1968 through 1977. In its defense, U.S. Silica said the danger of exposure was common knowledge in the industry and that it was the employer’s responsibility to inform and protect workers from the hazards of dust. The company is currently appealing the award to the Texas Supreme Court. It is the largest silica verdict in the state to-date.

Another notable case, also pending before the Texas Supreme Court, is a $1.9 million award affirmed in 2002 to a worker who was exposed to silica during abrasive blasting and subsequently developed silicosis. The worker claimed that Humble Sand & Gravel Inc, a manufacturer of some of the silica flint used in his job, failed to adequately warn users about the dangers of silica exposure. In its defense, the company claimed it had no duty to warn of the dangers of silica because it only sold its products to sophisticated users (a sophisticated user is one who knew or should have known of the hazards associated with a material), but the Texas Court of Appeals refused the defense. In its silica report, General Re notes that any decision on the sophisticated user defense for sand suppliers will have a dramatic effect on future litigation. “If the highest courts affirm use of the defense, it appears that suppliers, or at least those suppliers with strong warnings on their packages, may not bear the brunt of silica liability,” it states.

In a more recent decision the Wisconsin Supreme Court held on July 2, 2004 that a defendant cannot be held strictly liable for a plaintiff’s silicosis when the silica sand underwent a material and substantial change after leaving a defendant’s possession. The worker brought suit against Badger Mining Corporation and several respirator manufacturers, alleging that he had contracted silicosis as a result of his exposure to silica sand at the Neenah Foundry from 1955 to 1996. From 1980 to 1996, Badger supplied silica sand to Neenah. Once at the foundry, the silica sand is mixed with other substances and undergoes several other processes to form molds into which molten metal is poured. The court ruled that the characteristic that makes Badger’s silica sand dangerous, its respirability, did not arise until the compacted sand in the molds was fractured, vibrated and shaken loose (releasing silica dust) for reuse by Neenah during the foundry process. It relied on expert testimony that when the silica sand left Badger it could not cause
silicosis because the granules were too large to be inhaled. The decision affirms a 2003 court of appeals ruling.  

Silica-related cases are also making for increasing publicity overseas. A law firm in the United Kingdom in August 2003 said it is planning a multi-million pound class action lawsuit on behalf of several hundred former South African gold miners against UK mining company Anglo American and other companies. The landmark suit alleges the workers contracted silicosis as a result of bad ventilation in the mines. And in November 2001, a court in China awarded $24 million in damages against the employers of approximately 200 Chinese farm workers who contracted silicosis after digging a tunnel for a major highway in 1993. The court said the defendant companies took inadequate preventive measures to effectively protect the workers from silicosis as they dug into rock that had a silicon dioxide density of 97.6 percent.

Another development in the U.S. which has added to insurer concerns is the recent creation of a federal compensation program for workers in the nuclear weapons production industry exposed to silica and other occupational illnesses. The Energy Employees Occupational Illness Compensation Program Act of 2000 established a program to provide compensation to employees of the Department of Energy, its contractors and subcontractors, companies that provided beryllium to the DOE and nuclear weapons employers. Under the act, covered employees who suffer from cancer caused by radiation, beryllium disease, or chronic silicosis are eligible for a lump sum payment of $150,000 for disability and payment of future medical expenses associated with the disease. The program, which went into effect July 31, 2001, also provides benefits to survivors. At a meeting of the National Association of Insurance Commissioners in June 2001, the American Insurance Association warned of potential threats posed by the act to state workers’ compensation systems.

The Next Asbestos?

The sharp increase in silicosis claims is leading many to question whether silica is the next asbestos. A glance at the numbers so far suggests that it is too early to draw such a conclusion. Asbestos continues to dwarf silica in terms of claims and costs. A 2002

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8 Haase v. Badger Mining Corporation, 2003 WI App 192, 266 Wis. 2d 970, 699 N.W. 2d 737.
RAND Institute for Civil Justice study\(^9\) reported that some 8,400 companies have had asbestos claims filed against them and 600,000 people filed asbestos-related personal injury claims through the end of 2000, typically against multiple defendants. It estimated that to-date asbestos litigation has cost around $54 billion, and that up to another 2.4 million claims could be filed in the future (Exhibit 19). Five states – New York, Mississippi, West Virginia, Ohio, and Texas – which accounted for just 9 percent of asbestos cases filed before 1988, handled 66 percent of the filings between 1998 and 2000.

The economic impact of asbestos is enormous. A study by economist and Nobel laureate Joseph Stiglitz\(^{10}\), commissioned by the American Insurance Association and conducted by Sebago Associates, found that asbestos lawsuits have caused some 61 companies employing over 200,000 people to file for bankruptcy protection and from 52,000 to 60,000 Americans to lose their jobs. It estimated the direct costs of asbestos litigation at $325 million to $650 million and the indirect costs at $1.4 billion to $3 billion. Another reason for the escalation in costs is the fact that the claiming process in asbestosis cases has been abused. Data from actuarial consulting firm Tillinghast-Towers Perrin and RAND indicate that up to 90 percent of asbestos plaintiffs are actually unimpaired by any asbestos-related ailment. Despite this fact, unimpaired claimants receive 65 percent of the total compensation while truly sick individuals receive just 35 percent. So far only two companies with substantial silica liabilities are reported to have declared bankruptcy. Still, given the substantial similarities between asbestos and silica and the sharp rise in silica-related litigation, it would not be surprising if more companies with silica liabilities moved to declare bankruptcy.

Like asbestos, silica is still in use in the U.S. today, despite the known health hazards. In 1974 the National Institute for Occupational Safety and Health (NIOSH) recommended that silica sand be prohibited for use as an abrasive blasting material. Its use for most blast-cleaning operations was banned in Great Britain in 1950 and in other European countries in 1966. However, the use of asbestos has never been banned in America,

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\(^{10}\) The Impact of Asbestos Liabilities on Workers in Bankrupt Firms, Joseph Stiglitz, Jonathan Orszag, Peter Orszag, Sebago Associates, Commissioned by the American Insurance Association, December 2002.
though asbestos mining ended in the U.S. in 2002 and its use in insulating material has declined substantially since the early 1970s. Similar to asbestos-related illnesses, silicosis cases have a long latency period, typically more than 10 years, though as noted before, acute silicosis can develop much more quickly. Silicosis, like asbestosis, is a pulmonary disease and diagnosed with a chest x-ray.

Documented silica claims may not be in the hundreds of thousands, but the widespread exposure of many industries and occupations is similar to asbestos and indicates the actual number of current and potential silicosis cases could be much higher than it is. As noted earlier, based on state data, manufacturing, construction and mining industries are where the majority of silica cases originate. According to the U.S. Bureau of Labor Statistics, in 2002 total manufacturing employment averaged 15.3 million, total construction employment averaged 6.7 million, and employment in total natural resources and mining averaged 581,000. In its report, General Re cautions that given the list of classes of business where workers may have been exposed to silica dust over the past 40 years, it is practically impossible to determine the exact size of the potential plaintiffs’ pool. However, it goes on to state that some information points to the conclusion that the potential plaintiffs’ pool may be very large.

Given these similarities, it is hardly surprising that the process that generated a huge volume of asbestos cases, is now being adapted and used in the filing of silicosis claims. According to the Coalition for Litigation Justice, many of the same law firms that handled the bulk of asbestos claims are now handling silica claims. It reports that some of these law firms are repackaging their asbestos cases and plaintiffs into silica cases and plaintiffs. The same mass screening firms that hold asbestos screenings are now holding silica screenings, the CLJ notes, and in some cases doctors reviewing x-rays from these screenings file two reports on the same person, one report diagnosing the individual with asbestosis and the other diagnosing the same individual with silicosis. Some of these plaintiffs file claims for both diseases. The CLJ also reports that the states where the majority of silica cases are being filed are in what plaintiffs’ lawyers have referred to as “magic jurisdictions” for asbestos claims. A rise in so-called “mixed-dust” disease claims is also being seen, where the specific source giving rise to the injury or illness is
not distinguished. These types of claims have the potential to be applied by plaintiff’s lawyers to several disease categories, including silicosis.

Silica and Insurance

As noted above, insurers have reported seeing increasing numbers of silica claims. In recent years, asbestos claims and litigation have spread far beyond the original manufacturers of asbestos to target many different types of industries in the U.S. The Stiglitz\(^5\) study notes that prior to the 1970s, workers with asbestos-related disease generally filed for relief through state workers compensation systems, until a 1973 U.S. Court of Appeals ruling found that manufacturers were liable if they failed to warn consumers about the risks of asbestos exposure. Today, RAND estimates that more than 6,000 companies are defendants in asbestos litigation, compared with just 300 asbestos defendants in the 1980s (Exhibit 19). RAND also reports that companies in 75 of 83 types of industries in the U.S. economy are now asbestos defendants. As a result, increasing numbers of companies are declaring bankruptcy, prompting the closure of plants and job cuts in many states. If a similar development occurs with silica, it could lead to severe economic consequences.

The ever-expanding list of asbestos defendants is attempting to call on every possible pocket of insurance coverage to fund claims. Asbestos-related insurance claims have traditionally been filed under the products liability section of commercial policies, which limited the coverage. As many of these policies reached their aggregate limits, however, asbestos defendants with installation activities have attempted to obtain additional insurance coverage by reclassifying claims under “premises and operations” coverage, claiming that exposure occurred during the installation, rather than from the finished product. If defendants are successful in this reclassification, significant additional coverage can be available, since premises and operations coverage generally does not have aggregate limits.

In discussing the issue of coverage, General Re’s report notes that to-date most general liability (GL), products liability and commercial umbrella policies do not contain a specific exclusion targeting silica-related injuries, and ISO forms do not contain such a wording, so individual insurers must draft their own silica exclusions. Any such wording
would be expected to follow the basic language and lessons from any asbestos exclusions used by companies. Further, should silica litigation begin to include allegations of premises liability, it believes the absolute pollution exclusion may be upheld in certain jurisdictions. It notes however, that in several states the courts have not applied the absolute pollution exclusion to claims arising from indoor releases, nontraditional environmental pollution, and/or where no environmental remediation is necessary. Other jurisdictions have limited what is considered a “pollutant” to only those specific items listed within the definition, or they have interpreted these terms narrowly.

General Re also notes that to the extent that claims are based on workplace exposures of insured employers, the ‘exclusive remedy’ of workers compensation insurance and GL exclusions should keep most claims out of the GL arena. While the cost of servicing such claims is potentially high for workers compensation insurers, the ultimate costs would undoubtedly be much higher if such claims are handled through litigation in the tort system. The distinction, of course, is that workers compensation benefits are determined by statute while awards in tort cases are notoriously unpredictable. Individual judges and juries in hundreds of different jurisdictions are empowered to award enormous sums to plaintiffs (and consequently their attorneys) often with little regard to actual economic damages. Indeed, one hallmark of the U.S. tort system is its extraordinary inefficiency. In the case of asbestos, it is estimated that as much of half of all system costs are "frictional," including attorney fees and other administrative expenses. In general, Tillinghast Towers-Perrin estimates that just 22 cents out every tort dollar ever reach plaintiffs to compensate them for economic losses. In contrast, attorney fees consume 33 percent of each tort dollar, administrative expenses 21 percent and awards for non-economic loss 24 percent (Exhibit 20). At least one state has moved to limit asbestos and silica litigation. In early June 2004, Ohio Governor Bob Taft signed into law two bills that establish medical criteria for filing asbestos and silica lawsuits. The bills require plaintiffs to provide medical evidence to prove that their exposure to asbestos or silica was a substantial factor in the cause of illness. House Bill 342 relates to silicosis claims and mixed dust claims, while HB 292 applies to asbestos claims. Both bills are scheduled to take effect at the beginning of September 2004, but trial lawyers
have already started referendum proceedings that if successful could delay the legislation, making it subject to approval by the Ohio electorate in November 2004.

General Re says it is difficult to predict how future courts will rule on coverage arguments in relation to silica. However, for now, based on asbestos litigation where the possible application of asbestos exclusions has been questioned, it appears that silica exclusions are the most reliable means to avoid silica exposures. It goes on to note that any policy language should be drafted with care to address all the exposures the insurer wants to cover or avoid. As an example, it points out that since claims can arise from “mixed dusts” containing silica, insurers should consider if any exclusion applies to mixed dusts as well as silica. Another example is that any exclusion limited to “silicosis” could also allow coverage of other lung diseases.

Anecdotal evidence suggests that some insurers are already excluding silica exposure. In the Council of Insurance Agents and Brokers (CIAB) quarterly market index for the first quarter of 2004, the survey suggested that silica is beginning to be excluded from renewal policies. The reports came from brokers in the Midwest and the Southeast. It is the first time that silica has appeared in the CIAB’s market index responses.

A Standard & Poor’s (S&P) research report published in June 2004\textsuperscript{11}, notes that insurance companies, aware of the growing potential for large settlements involving silica, have begun setting aside reserves. According to S&P, Chicago-based CNA added $81 million to reserves for mass torts in the third quarter of 2003, citing elevated volumes of silica claims during the past year. Other companies have mentioned increased silica claims activity in their financial statements without disclosing specific reserve amounts. S&P warns that the parallels of silica to asbestos are of concern. The ratings agency notes that insurers are bowing to the inevitable and upping their reserves for asbestos exposure. Thirteen of the companies with the largest exposures upped the collective amount set aside by $14.6 billion during calendar years 2002 and 2003. S&P says that if history is a guide, silica litigation and disclosure by defendants and their insurers could balloon the way the asbestos crisis has. S&P has therefore added silica exposure, along with other mass torts, as a discussion topic in its credit evaluation of insurers.

\textsuperscript{11} Standard & Poor’s, Research: Silica Concerns Grow But Disclosure Limited; June 10, 2004.
The growing number of asbestos claims has forced insurers to increase their reserves. Insurers’ unfunded asbestos exposure was $20 billion as of year-end 2002, according to A.M. Best (Exhibit 20). Another asbestos-like mass tort can only add to the pressure on the property-casualty insurance market. There would also be a significant impact on the reinsurance market. A recent special report from Fitch$^{12}$ suggests that around two thirds of primary companies’ asbestos-related claims are passed on to reinsurers. The likely outcome of all this for policyholders is that their insurance costs will rise. High damage awards, in addition to other factors, have already pushed up the cost of liability coverage substantially.

According to the 2004 Casualty Cost of Risk report by broker Marsh Inc., the construction industry, which has such a significant exposure to silicosis, currently ranks sixth highest of 23 industries in casualty cost of risk, spending on average $4.23 per $1,000 of revenue on its primary casualty insurance program (Exhibit 21). As the cost of liability insurance increases, it is likely that many businesses may buy less coverage, leaving them vulnerable to catastrophic losses. Another Marsh study$^{13}$ noted that the average cost for liability insurance across the U.S. increased 63.4 percent during the 12-month period ending January 31, 2003 while limits purchased by all U.S. companies fell by 9.4 percent in 2003, reflecting the continued rise in insurance costs as well as the sluggish economy.

**Summary**

Silica liability is an important and developing issue. Even while silicosis-related deaths are declining steadily, the number of personal injury claims being filed on behalf of individuals suffering from occupational lung disease caused by exposure to silica appears to be increasing sharply. Given the history of asbestos litigation, it is inevitable that silica is being compared to asbestos. However, as this report suggests, while there are similarities between asbestos and silica, it is much too early to draw any conclusions from this. Between 1990 and 1999, the mortality rate for silicosis was one-fifth of the asbestos mortality rate and to-date silica-related claims and costs appear significantly

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smaller by comparison to asbestos claims. Still, with a wide variety of industries and occupations potentially exposed to silica, it is understandable that there are concerns that the actual number of current and potential silicosis cases could be much higher. Just as asbestos claims and litigation have spread far beyond the original manufacturers of asbestos to target many different types of industries in the U.S., a similar widening of the silica litigation net could involve substantially more plaintiffs and defendants than have been identified to-date.

Following this report are 22 tables which illustrate the silica liability issue, as discussed above.

For additional information, see:

- Insurance Information Institute, www.iii.org
- National Institute for Occupational Safety and Health, www.cdc.gov/niosh/
- Occupational Safety and Health Administration, www.osha.gov
- Centers for Disease Control and Prevention, www.cdc.gov
- Department of Health and Human Services, www.hhs.gov
- National Center for Health Statistics, www.cdc.gov/nchs/
- U.S. Silica, www.u-s-silica.com
- Halliburton Company, www.halliburton.com
- 3M, www.3m.com
- General Reinsurance Corp, www.genre.com
- National Association of Insurance Commissioners, www.naic.org
- RAND Institute for Civil Justice, www.rand.org/icj/
- Tillinghast Towers-Perrin, www.tillinghast.com
• Fitch Ratings, www.fitchratings.com
• Marsh, www.marsh.com
• Council of Insurance Agents & Brokers (CIAB), www.ciab.com
Silica: An Emerging Problem

- Crystalline silica, or quartz, is the second most common mineral in the earth’s crust and a major component of sand, rock and mineral ores.

- Overexposure to respirable crystalline silica can cause a disabling and sometimes fatal lung disease called silicosis.

- More than 1 million US workers currently are exposed to crystalline silica and each year more than 250 of them die with silicosis.

Source: National Institute for Occupational Safety and Health (NIOSH) and the Department of Labor (DOL)

Exhibit 1

Occupations at Greatest Risk of Silica Exposure

- Construction - sandblasting, rock drilling
- Mining - cutting or drilling through sandstone and granite
- Foundry work - grinding, moldings
- Stone cutting - sawing, abrasive blasting, chipping, grinding
- Glass manufacturing
- Agriculture - such as plowing or harvesting
- Shipbuilding - abrasive blasting
- Ceramics, clay, and pottery
- Railroad - setting and laying track
- Manufacturing of soaps and detergents
- Manufacturing and use of abrasives

Source: National Institute for Occupational Safety and Health (NIOSH) and the Department of Labor (DOL)
**Exhibit 3**

**Occupational Exposure to Silica Dust by Industry (000’s)**

- **Exhibit 3**
- **Types of Silicosis**
  - **Chronic silicosis** – usually occurs after 10 or more years of overexposure at relatively low concentrations.
  - **Accelerated silicosis** – results from higher exposures and develops over five to 10 years.
  - **Acute silicosis** – occurs after exposure to high concentrations and can cause symptoms to develop within a few weeks or up to five years.

Source: National Institute for Occupational Safety and Health (NIOSH) and Department of Labor (DOL).
Some two thirds of silicosis deaths occurred among people aged 65 or greater between 1990 and 1999.

The number of silicosis deaths continues to decline and is now down to less than 200 annually.

Silicosis was designated as the underlying cause of death in half of all silicosis deaths during this period.
Silicosis: Number of Deaths by State 1990-1999

Pennsylvania alone accounts for nearly 18% of silicosis deaths for the 1990-1999 period. PA also ranks fourth in age-adjusted silicosis mortality rate behind West Virginia, Vermont and Colorado.

Source: National Center for Health Statistics

Age-Adjusted Silicosis Mortality Rates by State, 1990-1999

Source: National Center for Health Statistics
Silicosis Mortality Rates By State: Top 5 and Bottom 5 (1990-1999).

West Virginia had the highest age-adjusted death rate in the nation from silicosis, while Hawaii had the lowest (no reported deaths). The overall U.S. death rate from silicosis was 0.94 deaths per million population.

Source: National Center for Health Statistics

Asbestosis Mortality Rates By State: Top 5 and Bottom 5 (1990-1999).

The overall U.S. death rate from asbestosis was 4.05 deaths per million population in the 1990-1999 period. This is more than three times as high as the median death rate for silicosis over the same period.

Source: National Center for Health Statistics

Age-adjusted rate per million population

Source: National Center for Health Statistics

Primary Industries Associated with Silica Exposure in Three States, 1989-1998*

*Data reported by Michigan, New Jersey and Ohio.
Source: Provisional SENSOR surveillance data as of September 2002, aggregated by reporting source years.
Primary Occupations Associated with Silica Exposure in Three States, 1989-1998*

Operators, fabricators and laborers represent the majority of silicosis cases.

Operators, fabricators, and laborers: 768 (66%)
Unclassifiable or unemployed: 123 (10%)
Precision production, craft, and repair: 265 (22%)
Other: 24 (2%)

*Data reported by Michigan, New Jersey and Ohio.
Source: Provisional SENSOR surveillance data as of September 2002, aggregated by reporting source years.

Silicosis: Most Frequently Recorded Industries on Death Certificate in U.S. 1990-1999

U.S. residents aged 15 and over, selected states and years, 1990-1999, by number of deaths.

- Industry not reported: 23
- All other industries: 20
- Structural clay products: 23
- Machinery, except electrical, n.e.c.: 33
- Not specified manufacturing industries: 44
- Misc. nonmetallic mineral and stone products: 48
- Iron and steel foundries: 48
- Nonmetallic mining and quarrying, except fuel: 51
- Blast furnaces, steelworks, rolling and finishing mills: 69
- Coal Mining: 86
- Metal Mining: 118
- Construction: 317

Source: National Center for Health Statistics multiple cause of death data.
Silicosis: Most Frequently Recorded Occupations on Death Certificate

U.S. residents aged 15 and over, selected states and years, 1990-1999

- Mining machine operators: 16%
- Laborers (except construction): 10%
- Managers & administrators (n.e.c.)*: 4%
- Supervisors, production occupations: 4%
- Janitors & cleaners: 3%
- Machine operators, not specified: 3%
- Construction laborers: 3%
- Molding & casting machine operators: 3%
- Supervisors & proprietors, sales occupations: 2%
- Truck drivers: 2%
- Occupation not reported: 3%
- All other occupations: 47%

*Not elsewhere classified. N.B. Percentages may not total to 100% due to rounding.
Source: National Center for Health Statistics multiple cause of death data.

Exhibit 15

Silicosis: Proportionate Mortality Ratio (PMR) By Usual Occupation*

- Miscellaneous metal & plastic processing: 92.71
- Hand molding, casting, and forming occupations: 41.97
- Hand molders & shapers, except jewelers: 38.91
- Crushing & grinding machine operators: 31.12
- Molding & casting machine operators: 19.36

Workers in miscellaneous metal and plastic processing, hand molding and forming, crushing and grinding machine operators and mining occupations had the highest PMRs for silicosis mortality.

*Adjusted for age, sex, race, U.S. residents age 15 and over, selected states and years, 1990-1999.
Source: National Center for Health Statistics multiple cause of death data.

Exhibit 16
Leading industrial sand producer U.S. Silica today faces more than 22,000 silica claims.
Some 15,342 plaintiffs have named the company in lawsuits so far in 2003 - triple the number seen in 2002.

Some 87% of the lawsuits filed are from Mississippi and Texas.

Silica-related suits are targeting a wide range of defendants:

- Suppliers of silica sand and other silica-containing products.
- Manufacturers of protective gear.
- Manufacturers or equipment and/or machinery used in the sandblasting, grinding or other processes involving silica (e.g. filter and respirator manufacturers).

Source: Coalition for Litigation Justice; (* through 6/30/03)

Source: General Reinsurance Corp, "Silica Primer – An Asbestos "Spin-Off?", October 2003
## Asbestos: Estimated Claims and Costs

<table>
<thead>
<tr>
<th></th>
<th>1982</th>
<th>Today</th>
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<tbody>
<tr>
<td>Number of Claimants</td>
<td>21,000</td>
<td>600,000</td>
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<tr>
<td>Number of Defendants</td>
<td>300</td>
<td>6,000</td>
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<tr>
<td>Total Costs to date (nominal $)</td>
<td>$1 B</td>
<td>$54 B</td>
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<tr>
<td>Bankruptcies</td>
<td>3</td>
<td>60</td>
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<tr>
<td>Estimated future costs (nominal $)</td>
<td>$38 B</td>
<td>$145-$210 B</td>
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</tbody>
</table>

Source: RAND Institute for Civil Justice, Asbestos Litigation Costs and Compensation, An Interim Report, 2002

## Where the Tort Dollar Goes (2002)

- **Tort System is extremely inefficient:**
  - Only 22% of the tort dollar compensates victims for economic losses
  - At least 54% of every tort dollar never reaches the victim

<table>
<thead>
<tr>
<th>Type of Cost</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Claimants' Attorney Fees</td>
<td>19%</td>
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<tr>
<td>Awards for Economic Loss</td>
<td>22%</td>
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<tr>
<td>Administration</td>
<td>21%</td>
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<tr>
<td>Awards for Non-Economic Loss</td>
<td>24%</td>
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<tr>
<td>Defense Costs</td>
<td>14%</td>
</tr>
</tbody>
</table>

Source: Tillinghast-Towers Perrin
**Asbestos: Reserve Deficiency and Ultimate Costs Growing**

The U.S. P/C industry’s asbestos reserve deficiency declined modestly in 2002, amid $8 billion in charges during the year.

**Casualty Cost of Risk Per $1,000 of Revenue**

Construction ranks 6th highest of 23 industries in casualty cost of risk, spending on average $4.23 per $1,000 of revenue on its primary casualty program.