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TRIBUNE INVESTIGATION

Deadly metal's use endangers workers

Employers often don't warn about risks from beryllium

By Sam Roe
Tribune staff reporter

Thousands of American workers are at risk for developing a chronic, often fatal lung disease because companies have exposed them to the highly toxic metal beryllium without adequate safeguards or warnings, a Tribune investigation has found.

Workers in a variety of businesses, including the electronics, recycling, machining and dental industries, have been harmed by the deadly metal, whose toxic dust slowly damages victims' lungs.

In Florida, a dental lab worker developed beryllium disease after grinding crowns and bridges containing the metal. In

Texas, a Salvadoran immigrant died of the illness after working at a metal recycling company. And in Crystal Lake, Ill., 27-year-old machinist Richard Bowman contracted the disease at a small foundry. "I never even heard of beryllium disease until after I got sick," Bowman said.

Beryllium disease was once found primarily in the defense industry because of the metal's use in nuclear bombs and other weapons. Though still relatively rare, the illness now is emerging in private and consumer industries, where beryllium is valued for its light weight and superior strength.

The government agency responsible for protecting workers, the federal Occupational Safety and Health Administra-

tion, requires workplace warnings on beryllium and places limits on beryllium dust exposure. It also has voluntary guidelines recommending that every company handling beryllium—no matter how small the business—regularly monitor its air for beryllium dust, provide employees with work clothes and showers, and offer medical testing to any worker potentially exposed.

But companies are not following these rules and guidelines, and the government is not enforcing its laws.

The Tribune investigation was based on thousands of court, industry and government documents and dozens of inter-

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Tribune photo by Candice C. Cusic

David Bustos of San Jose, Calif., underwent testing at National Jewish Medical and Research Center in Denver in April that found he has beryllium disease. He worked in metal recycling.

BERYLLIUM: ‘This is a disaster waiting to happen’

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views with health officials and business owners. Among the findings:

- Many businesses across the country are not taking basic precautions, such as air monitoring, to protect workers, interviews with company officials show. In a spot-check of 30 businesses working with beryllium, the newspaper found that none was following all of OSHA's recommended safeguards.

- Warnings from beryllium manufacturers and distributors are often inaccurate, misleading and incomplete. Of the 10 warnings reviewed by the newspaper, nine failed to abide by OSHA rules. Four failed to even mention beryllium disease.

- OSHA rarely inspects companies handling beryllium. Several Chicago-area businesses working with the metal have not been inspected in 10 years.
- Thousands of firms use beryllium, but only a small fraction have provided workers with blood tests to detect possible harm, according to laboratory analyses of the tests. Health officials recommend blood testing so the incurable illness can be detected early, and treatment can attempt to limit lung damage.

Even for experienced industrial hygienists and engineers, protecting workers who use beryllium is difficult. The U.S. Department of Energy has spent millions of dollars in the past 25 years at its weapons facilities to protect workers, an effort that has included extensive air sampling and ventilation. Yet since testing began in the 1980s, 165 Energy Department employees and contract workers have been diagnosed with beryllium disease.

David Michaels, the top health official in the Energy Department during the Clinton administration, said that given the government's experience with the illness, he thinks it is virtually impossible for private companies with limited resources to adequately protect workers. He called for a ban on beryllium, except for national security purposes, and decried the spread of the metal to many different industries and consumer markets.

"This is a disaster waiting to happen," said Michaels, former assistant energy secretary for environment, safety and health and now a public health professor at George Washington University.

But Brush Wellman Inc., the nation's leading beryllium producer, disputed Michaels' assessment.

"Many customers both large and small have safely used beryllium-containing materials over the years," the company said in a written statement. "... We believe it is unfair for anyone to assume that just because a company is small that it is unwilling or unable to provide adequate resources to protect its workers."

The National Jewish Medical and Research Center in Denver, a leading respiratory disease hospital that diagnoses more beryllium illnesses than any other facility, reports a rise in cases among workers in private industry in the past few years. Dr. Lee Newman, a scientist at National Jewish and an expert on beryllium disease, said that since 1985, National Jewish has diagnosed about 100 cases among workers outside the defense industry and major beryllium production plants.

Newman called that figure "the tip of the iceberg." He said the disease often goes undetected and that many workers have the illness and don't know it.

Experts say there are two main reasons for the rise in reported beryllium disease: a new blood test that is detecting cases that might have been missed previously, and the widening use of beryllium in industries not fully aware of the hazards or ill-equipped to protect workers.

Even though beryllium is one of the most toxic substances known in the workplace, no one knows precisely how many companies use the metal, how many workers are exposed, how many have the disease or how many have died.

Brush Wellman declined to tell the Tribune how many customers it has, but a company official testified recently in a court case that the firm has about 7,000 in the U.S.

No central registry tracks the number of beryllium disease cases, but scientific papers, government reports and industry records indicate that there have been about 1,300 cases nation-



Items with beryllium, including copper tubing, pins used in telecommunications and ore.

wide since the 1940s, with several hundred deaths.

And while workers who inhale beryllium dust have a long risk of developing the disease, scientists are unclear on what percentage actually do. Studies vary, concluding that 1 percent to 16 percent of workers exposed get sick. Genetics appears to be a factor, but researchers cannot predict with certainty who is susceptible.

Nor do scientists know exactly what percent of victims die of the illness. Researchers and doctors estimate that, historically, about one-third die. That number may improve, experts say, because recent medical advances have resulted in earlier diagnosis and treatment of the illness.

In many ways, beryllium disease puzzles scientists as much today as it did when it was discovered in the 1940s. Scientists still ask: Why do some people contract the disease with little exposure while others work around the dust for years with no harm? Why do some develop the illness quickly while others don't until decades after their last exposure? Why do some with the disease live relatively healthy lives while others must spend years tethered to an oxygen tank?

Even the metal itself is a contradiction: It is lighter than aluminum yet stiffer than steel. A large block of pure beryllium looks too heavy to pick up, but it is as light as plastic foam. These rare properties have long made beryllium a coveted material in the defense industry, which has used it for decades in nuclear weapons, missiles and other military applications. But with the end of the Cold War, the metal has been used in an increasing variety of markets. It is in golf clubs, cell phones and car ignition systems. It is in millions of tiny components in computers and in the lengthy telecommunications cable networks running along the ocean floors.

For consumers, beryllium appears to pose no harm. Researchers say they are unaware of anyone contracting beryllium disease by handling a finished product, such as a golf club or computer.

But for workers who machine, melt, polish or alter beryllium any way that creates dust or fumes, there are risks. Microscopic amounts of dust can cause disease—even for people not directly working with the metal, such as custodians, guards, company nurses and outside contract workers.

Through interviews with owners and managers of 30 businesses spot-checked nationwide, the Tribune was able to account for at least 2,000 workers who either worked with beryllium or in its vicinity since 1970 without adequate safeguards or warnings.

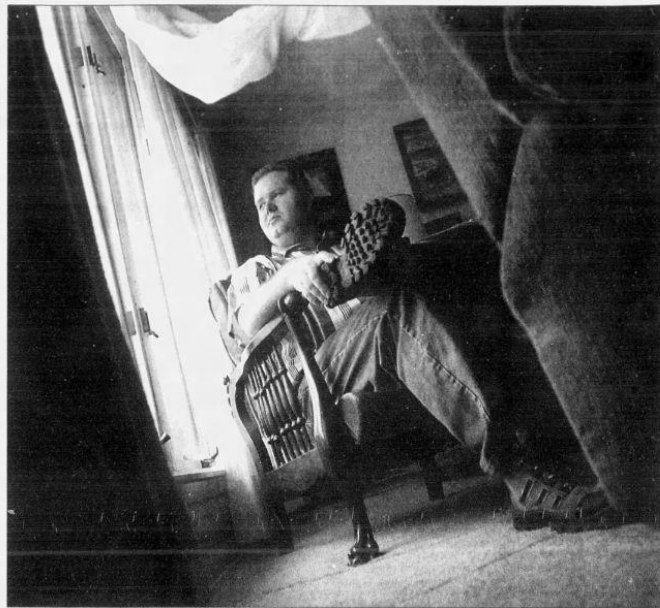
Some company officials acknowledged taking no precautions; others described following some of OSHA's guidelines, but not all.

Peter Infante, OSHA's director of the Office of Standards Review, called beryllium dust "one of the most frightening toxic exposures you could experience in the workplace today." He said if companies don't follow the agency's guidelines, "then I think they are unnecessarily putting workers at risk of developing a fatal disease."

Brush Wellman, a subsidiary of Brush Engineered Materials Inc. of Cleveland, has spent millions of dollars trying to protect its employees. But workers have contracted beryllium disease at several of the company's facilities. At its main plant outside Toledo, Ohio, at least 25 workers have been diagnosed with the disease since 1993, according to previous statements by the firm.

Brush Wellman documents filed with OSHA indicate about 80 of its workers have been diagnosed with the disease since the 1940s, including about 110 in the past 10 years.

The firm also faces mounting litigation: About 75 lawsuits are



Richard Bowman of Crystal Lake, Ill., contracted beryllium disease at a foundry. In 1998, he developed a nagging cough and became easily winded. The eventual diagnosis surprised him. "I never even heard of beryllium disease until after I got sick," he said.

A hazardous metal's effect on the body

Beryllium is an extremely lightweight metal that is six times as stiff as steel. It is not hazardous in solid form, but machining, sanding or otherwise altering the metal can create dust that can be deadly. Some workers who inhale the dust may develop an often-fatal lung illness called beryllium disease, or berylliosis. There have been an estimated 1,300 cases in the U.S. since the 1940s.

SYMPTOMS OF BERYLLIUM DISEASE

It can take up to 40 years after exposure to develop symptoms, which can include:

- Cough
- Shortness of breath
- Fatigue
- Fevers or night chills
- Weight loss

EVALUATION AND TREATMENT

Blood tests and chest X-rays are used to help confirm a diagnosis of the disease. It can be treated with steroids to counter inflammation, but there is no cure.

About the metal

SOURCES

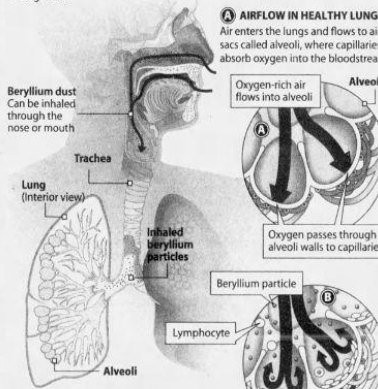
Beryllium occurs naturally and is extracted from ore that contains the minerals bertrandite or beryl. A series of chemical processes turns it into metal.

USES

Beryllium can be found in computers, cellular phones and dental work as well as high-tech defense applications such as missiles, jets and nuclear weapons.

EXPOSURE LIMIT

The federal exposure limit is 2 micrograms of beryllium dust per cubic meter of air—roughly equivalent to a marble-size piece ground up and scattered in a 6-foot-high box that is 1 mile long and 1 mile wide.



③ AIRFLOW IN DAMAGED LUNGS

Inhaled beryllium particles settle into the alveoli, where they are engulfed by protective lymphocytes. These cells build up along the alveoli's walls, creating scar tissue that prevents oxygen from reaching the capillaries—leaving patients fatigued and short of breath.

Sources: National Jewish Medical and Research Center; Department of Energy, "The Respiratory System" medical book.

pending, including a nationwide class-action by workers in Pennsylvania demanding that Brush Wellman, beryllium producer NGK Metals Corp. of Reading, Pa., and former producer Cabot Corp. of Boston provide medical testing for all workers who may have been exposed to beryllium dust while working for customers of the three companies.

Workers' attorneys said the testing likely would uncover thousands of illnesses. Researchers note that virtually every firm that has worked with beryllium and has tested workers has found disease or blood abnormalities—a condition that often leads to the illness.

NGK Metals and Cabot declined to comment for this article. Brush Wellman took questions from the Tribune in writing only and did not answer some of them.

In the written responses, Brush Wellman said it follows federal regulations by putting warning labels on its products and by sending customers a detailed statement on beryllium's hazards. The company also said it voluntarily sends customers updates on safety information and has a toll-free hot line for answers to health questions.

"Brush Wellman informs its customers of the health and safety aspects of working with beryllium-containing materials. Customers, in turn, are responsible for communicating that information to their employees, and as appropriate, to

their customers," the company said.

But Kathleen Kreiss, lead author of one of those studies and a beryllium disease expert, said it remains unclear whether pure beryllium is more dangerous than the alloys. "There are data on both sides," said Kreiss, a researcher at the National Institute for Occupational Safety and Health, part of the U.S. Centers for Disease Control and Prevention.

Brush Wellman also stated that generally the finer beryllium products move down the supply chain, the less the material is machined, sanded or otherwise altered in a way that might produce toxic dust. "In general, the less the material is worked, the lower the potential for exposure, which in turn results in lower overall risk," the company said.

Kreiss said that statement seems logical but that no studies have been done to determine the actual risks in secondary industries.

New wave of victims

As a teenager, Richard Bow-

man worked at weapons facilities and private beryllium processing plants supplying the metal.

When the Cold War ended, government orders for beryllium plunged, and Brush Wellman searched for new markets. The company, which once sold primarily to the government, today sells mainly to businesses in the computer, telecommunications and automotive electronics industries.

Many use beryllium alloys. It was that kind of metal that Bowman worked with, and some employers and workers mistakenly believe that it poses little risk. But scientific reports show workers have contracted the disease from the alloys, and OSHA's laws and guidelines apply to such metals.

As beryllium use was waning in the 1980s, scientists developed a blood test to determine whether a worker's immune system was starting to react to beryllium dust exposure. The test did not show whether someone had beryllium disease; further exams, such as a lung biopsy, were needed for that. But for the first time, doctors could easily determine who was affected by beryllium dust before symptoms—coughing, fatigue, shortness of breath—appeared.

The test was first used at nuclear weapons-related plants, helping uncover additional cases of the illness. The Energy Department, responsible for maintaining the nuclear arsenal, went on to test 22,000 of its employees and contract workers, finding a little less than 1 percent had the illness. After increased media scrutiny of beryllium's hazards, particularly by the Toledo Blade newspaper, Congress last year established a program to compensate ailing weapons workers.

But scant attention has been paid to victims in commercial industries—people like Bowman.

When he was diagnosed, he quit his job and was prescribed prednisone, a steroid that can stabilize the illness but also cause many side effects, including weight gain. Bowman, who is 6 feet tall, has gained 30 pounds since taking the drug, pushing his weight to 250.

Medical records state his lungs show "significant impairment," and Bowman said everyday activities leave him short of breath. "I get winded taking a shower and drying off," he said.

Like others with beryllium disease, Bowman faces an uncertain future. He is out of work and living with a friend's family in Crystal Lake. Worker's compensation is paying his medical bills, said his attorney, Kevin Justen.

Bowman is suing three companies—Brush Wellman, NGK Metals and Cabot Corp.—alleging they supplied his former workplace with beryllium without adequately disclosing the hazards. The three firms declined to comment. Bowman cannot sue his former employer, Tricast, or another business in the foundry for whom he later worked, Presford Corp., because worker's compensation laws generally bar such claims.

Truman Moore, owner of Tricast and Presford, said hundreds of employees have worked with beryllium at the two businesses in the past 40 years, and Bowman is the only one known to have contracted beryllium

Chicago Tribune/Lauren Cabell and Rick Tuma



Ramon Ventura's son Juan, his daughter Nelly Canales and his wife, Maria, visit him in May at Houston's Methodist Hospital. The metal recycling worker died days later of beryllium disease.

disease. He also said his companies post warnings about beryllium for workers to see.

"If I had any doubt that they were in danger, I'd definitely get whatever it took to protect them," he said.

But he acknowledged that his foundry quit using respirators more than 20 years ago because workers found them hot and no one appeared to be getting sick, that no engineering improvements were made after Bowman was diagnosed in 1988, and that the air has not been tested for beryllium dust since August of that year, when an area environmental firm took samples.

Results from that test showed that three of the six production workers were exposed to the highest amount of beryllium dust allowed by law, according to a copy of the report provided by Tricast. That level, government health officials agree, should trigger immediate action, including better engineering controls, respirator use and frequent air testing.

None of that was done. And the foundry has never given the appropriate blood tests to any of its current or former workers.

Bowman said he fears others at the foundry will get the disease. "They are my friends out there, so I hope they don't," he said. "It's not something you can wash off."

Limits and enforcement

Federal labor laws are clear: Companies are not allowed to expose workers to more than 2 micrograms of beryllium dust per cubic meter of air—roughly equivalent to a marble-size piece of beryllium spread in a six-foot high and a mile long and a mile wide.

And beryllium producers and distributors must provide their customers with a detailed warning called a material safety data sheet, outlining the hazards of the metal, the symptoms of exposure and the necessary safeguards.

But OSHA often goes beyond inspecting companies handling beryllium—even where disease has not been reported. At Tricast, where Bowman contracted the illness, the last OSHA inspection was in 1988.

Enforcement of warnings also is lax. Manufacturers and distributors frequently fail to state such fundamental information as beryllium dust can cause an often fatal, incurable disease.

One warning lists the wrong OSHA exposure limit, suggesting that workers can be legally exposed to amounts of dust 2½ times the actual allowable limit.

In fact, of the 10 warnings reviewed by the Tribune, only one complied with the rules, and that was from Brush Wellman—a company that recently had to revise some of its warnings after OSHA fined the firm in 1999 for inadequately stating the risks.

Regardless of what the warnings say, employers must keep copies of them and make them available to workers at all times. But that does not always happen. The Tribune found 14 Chicago-area dental labs using beryllium that reported not having the required warnings.

"I throw it away when it comes in," said David Cony, owner of Concept Dental Laboratory, a four-employee business in Chicago using a beryllium alloy. "Of course, I read it and all that, and then what am I going to do with it?" He said he did not know he was required to keep

the warnings and would do so in the future.

William Perry, OSHA's deputy director of health standards, said he thinks his agency has done a good job protecting beryllium workers. He said OSHA enforces its rules, keeps abreast of new research and, in 1999, published guidelines on the proper handling of beryllium.

For the past two years, OSHA enforces its rules, keeps abreast of new research and, in 1999, published guidelines on the proper handling of beryllium. He said OSHA enforces its rules, keeps abreast of new research and, in 1999, published guidelines on the proper handling of beryllium.

Increasing inspections, he said, would be difficult because OSHA has so few investigators—about 2,000 federal and state inspectors to cover 6.9 million work sites. And tougher enforcement of existing law is not necessarily the answer, he said. He emphasized the need for more scientific research so officials have a clearer picture of how to protect workers.

For the past two years, OSHA has been planning to tighten the 2 microgram worker exposure limit, set in 1949 but now viewed by many scientists as inadequate. Lowering a legal exposure limit can take years, and one obstacle OSHA faces is that no one is sure what level of beryllium dust is safe.

The current limit is also a critical issue in lawsuits against Brush Wellman. Plaintiffs' lawyers say the beryllium producer repeatedly told its customers that the exposure limit was protecting workers when it had evidence to the contrary.

Court documents show that Brush Wellman knew of scientific findings as early as 1974 that indicated workers were contracting the disease from exposures below the legal limit. The company has said it did not share those findings with customers because it believed the findings were false.

In 1996, the firm told its customers for the first time that workers might get sick at exposures below the OSHA limit, according to Brush Wellman's written response to the Tribune. The firm added that it has always fully informed its customers of beryllium's hazards, based on the state of knowledge at the time.

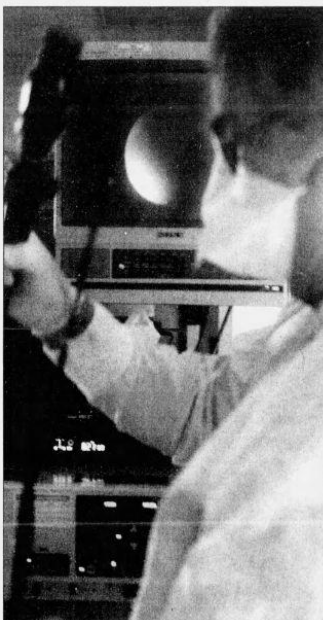
One warning that until recently had been on Brush Wellman's Web site, under the category of frequently asked questions by customers, posed this question: "I have heard that copper beryllium is toxic. Is this true?" The company answered that it was not hazardous to aquatic life and that people should not eat the metal.

But what the company neglected to say in its answer—and anywhere else in this particular warning—was that breathing beryllium-copper dust could be deadly. Beryllium disease was not mentioned.

In its written responses to the Tribune, Brush Wellman called its Web site statement on beryllium-copper "adequate," saying it was not designed to be a warning document. It was part of information used in sales and marketing material. In the past several months, Brush Wellman changed its Web site, which now lists the risks of beryllium-copper.

Dental industry

While American businesses display a wide range of knowledge about beryllium disease, many are not fully aware of the hazards, and some deny there is a danger at all.



Harvey Markel completes a lung procedure on David Bustos at National Jewish Medical and Research Center in Denver. Toxic beryllium dust slowly damages victims' lungs.

facturing crowns and bridges containing small amounts of the metal, according to researchers, scientific reports and court records. Cases have been reported in Georgia, Florida and Louisiana.

Margaret Simon, 54, of Lake Worth, Fla., was diagnosed with beryllium disease last year after working at a Florida dental lab. She said she cannot walk far without losing her breath and that her cough is so bad her husband once timed her: "I was coughing once every minute."

But some industry officials remain unaware of the potential dangers.

"I don't see there being a risk. I just don't see it," said Mark Jackson, owner of Precision Ceramics, a Montclair, Calif., dental lab that uses beryllium, and Speedent Dental Supplies, which sells beryllium-containing alloys and offers free samples on its Web site.

Jack Silcox, whose business, Jack C. Silcox Ltd. in West Salem, Ohio, distributes beryllium alloys to the dental industry, said he thinks that processing the small amounts of beryllium in dental alloys poses no risk to workers.

"Let's face it: The only ones at risk are in plants where they process beryllium," he said.

There are about 7,300 dental labs and 42,000 dental technicians nationwide, U.S. census statistics show. Most of the labs are small, privately owned businesses with fewer than five technicians who cast, grind and polish metals for dental work. Small amounts of beryllium, frequently 1.8 percent, are often mixed with other metals, usually nickel, to improve the

strength of crowns and bridges.

The number of labs using beryllium-containing alloys is not known, but interviews with officials from 31 Chicago-area labs found that 16, or about half, use them. Several acknowledged taking few safeguards.

"I never take precautions myself," said Philip Toofan, owner of Toofan Dental Art, a business in Chicago with one part-time employee.

He said he is aware that beryllium can be harmful but that safeguards such as respirators are too cumbersome. "There is no way you could really work freely, because this work is so delicate."

For dental patients, the risks appear remote. Scientists said they don't know of anyone contracting the disease from having a beryllium crown or bridge in the mouth.

Beryllium backlash

Some companies have stopped using beryllium after experiencing the metal's downsides, such as costly safety equipment, worker illness and litigation.

One California manufacturer stopped using beryllium oxide, a compound of beryllium, after at least three of its current and former workers—including company co-founder and CEO Joel Moskowitz—were diagnosed with beryllium disease, court records show.

Moskowitz said it remains unclear how he and others contracted the illness at his company, Ceradyne Inc., a Costa Mesa-based firm that makes ceramic parts for diesel engines and the defense industry. Safeguards were in place, he said, including extensive ventilation,

The 62-year-old CEO would not say how many of his workers have been diagnosed with beryllium disease, and he reported no visible symptoms of his illness: "I'm feeling terrific. I work out three days a week." The company stopped using beryllium in the mid-1990s, he said, because of increasing litigation related to the illnesses.

In Arizona, Karsten Manufacturing Corp., parent company of Ping Inc., a leading golf club maker and one of the most recognizable brand names in sports, quit using beryllium in its golf club heads in 1999. For about a decade, Karsten made beryllium-copper and beryllium-nickel Ping putters and irons.

But Karsten said it stopped using beryllium because the clubs were not selling well and the safeguards needed to protect workers were cost prohibitive.

The Phoenix-based company also acknowledged that an employee filed a worker's compensation claim for beryllium disease shortly before Karsten stopped using the metal. Plus, documents from the Industrial Commission of Arizona show that Karsten could not, at times, control beryllium dust and that workers were repeatedly overexposed.

In April 1989, Karsten's worker's compensation insurance company, Liberty Mutual, conducted air sampling at the firm and found that dust levels were above the legal limit. "These conditions were expected to continue... in order to meet unusually heavy production demands," the insurance company wrote in a report. Liberty Mutual recommended control measures, and the golf club maker took several steps, including temporarily stopping beryllium grinding operations.

But workers continued to be overexposed, documents show. The ventilation system in one area, a Karsten official wrote in October 1989, "appears to be incapable" of keeping air counts down.

Two weeks later, officials from the Industrial Commission of Arizona conducted a surprise inspection. They found workers were being exposed to beryllium dust up to 32 times the allowable limit. The commission fined Karsten \$560, and there were no citations for beryllium since.

Karsten attorney Luke Nardecucci said that, besides the one employee who filed a worker's compensation claim, there have been no other reports of illness and that no employee has taken up the company's offer of free blood testing.

Health officials say the only way for companies to know for sure the extent of a beryllium problem is to periodically do blood tests on workers who may have been exposed. But few companies are doing that.

One that started is American Airlines. Last year, the airline offered blood tests to about 100 current and former mechanics after learning that beryllium was in the metal that holds the engines to the wings of some planes. For years, the mechanics occasionally machined those engine mounts with no safeguards, American spokes-

man Mark Slitt said. The testing program cost about \$40,000. Slitt said, and every mechanic who was offered the test participated. Though only one showed a blood abnormality, the airline said it plans

to do follow-up testing within the next two years.

The company also said its mechanics now use respirators and vacuums when machining the engine mounts and that other beryllium-containing parts have been replaced. "I think we acted responsibly," Slitt said.

Metal recycling

David Bustos works in the recycling industry—the final destination for tons of beryllium-containing products. He drives a truck for Micro Metalics in San Jose, Calif., loading electronic scrap in the Bay area, but he previously operated machines that recycle the metal.

In May, the 47-year-old father of four was diagnosed with beryllium disease. "I'm scratching my head right now," Bustos said, "trying to figure out what happened."

Others in the metal recycling industry are just now learning of the risks. Computers, telephones and other scrap with bits of beryllium are recycled for the gold, silver and copper inside. When those items are burned, crushed and melted, beryllium dust or fumes may be released.

In the United States, several workers are known to have contracted beryllium disease this way. Toronto-based Noranda Inc., one of the world's largest recyclers of electronics, reports that 13 workers in its Canadian facilities have been diagnosed with beryllium disease recently and 30 show blood abnormalities, including a company nurse.

Bustos, of San Jose, is the only worker affected at Noranda's U.S. facilities, which include Micro Metalics.

Noranda started testing workers in 1999 after an employee complaining of breathing problems was diagnosed with beryllium disease. To date, the company has tested 2,500 workers—one of the largest beryllium screening programs ever.

Company spokesman Denis Couture said the firm had not known beryllium could cause lung disease in workers. But the metal was so common in electronic scrap. "Beryllium is found in pretty much everything these days—to our surprise."

The family of Ramon Ventura also was unaware of the dangers of beryllium. Ventura, a native of El Salvador, came to the U.S. in 1981 to find a better life for himself, his wife and three children. But after working at Ired and Alloys, a scrap metal recycler in Houston, he was diagnosed with beryllium disease. He sued the company, settling out of court last year for an undisclosed amount.

In recent months, his health nose-dived, and in May he was admitted to Methodist Hospital in Houston, where doctors put him on life support. For 18 days, a ventilator kept him alive. His attending physician, Dr. Imran Nizami, said his lungs were so damaged by beryllium disease that if the ventilator didn't breathe for him, he would die "in two seconds."

His youngest child, 23-year-old daughter Nelly Canales, visited him every day after work and prayed at his side. But on May 25, Ventura died. He was 58.

"He sacrificed his life to come here and give us a better life," Canales said. "We never imagined things like that happening in a workplace, but now we realize it does."

Tribune photos by Candice C. Cook