Deadly Alliance: A Special Six-Day Series

BLOCK NEWS ALLIANCE PHOTO BY ALLAN DETRICH

Bradner, O., resident Marilyn Miller would die soon after this photograph was taken. She died of beryllium disease, a lung illness that has affected scores of workers locally and nationwide. Government and industry records show that many of these illnesses and deaths have not been strictly accidental.

How government, industry chose weapons over workers

It is a substance many people have never even heard of. Yet for more than 50 years it has been one of the most critical materials to the U.S. government.

The substance: beryllium, a magical metal that is lighter than aluminum and stiffer than steel.

It makes missiles fly farther, jet fighters more maneuverable, and nuclear weapons more powerful.

But there is a catch: Workers who manufacture this rare material often contract a deadly lung disease from inhaling the metal's dust.

An estimated 1,200 Americans have contracted the disease, and hundreds have died – some in the Toledo area.

And many of these illnesses and deaths have not been strictly accidental.

A 22-month investigation by The Blade shows that the U.S. government and the beryllium industry have knowingly allowed thousands of workers to be exposed to unsafe levels of beryllium dust. This has occurred year after year, for more than 40 years.

And it continues today.

At the local beryllium plant outside Elmore, O., workers continue to be overexposed to beryllium and continue to be diagnosed with beryllium disease.

A recent study found 1 in 11 workers at the plant either have the disease or an abnormal blood test – a sign that they may very well develop the illness.

Some of these workers, documents show, were clearly overexposed and inadequately warned.

Time and time again, plant owner Brush Wellman Inc., America's leading beryllium producer, misled its workers – and deceived safety regulators.

When safety regulators tried to protect workers, they ran up against an overwhelming alliance: the beryllium industry and the U.S. defense establishment.

This alliance, records show, slowly undermined the regulators' safety efforts, and before it was all over, the government had cut a secret deal with Brush Wellman. The government got its valuable beryllium for years to come, and Brush got more money and a virtual monopoly.

Workers got more of the same: overexposure to beryllium dust.

The Blade investigation was based on tens of thousands of court, industry, and recently declassified government documents. Starting today, we detail our findings.

■ Today, we show how the government has sacrificed workers' health in the name of national security.

■ Tomorrow, we document how industry and defense officials twisted a plan to protect workers into a deal protecting themselves.

■ Stories Tuesday and Wednesday lay out Brush's actions – how the company has down played hazards, concealed documents, covered up its checkered past, and systematically tried to control the public's knowledge of beryllium.

■ On Thursday, we tell the story of Marilyn Miller, who contracted the disease while working as a secretary at a Brush plant. We follow her final days, and final hours.

■ Friday's edition explores how public officials have been quick to give Brush Wellman tax dollars but slow to raise health concerns.

Throughout the series, we'll take you to places across the country where the disease is a problem, from an aging Pennsylvania coal town to a former Colorado weapons plant.

You'll meet 7-year-old Gloria Gorka, killed by air pollution outside a beryllium plant; Butch Lemke, a former worker who has spent 15 years tied to an oxygen tank, and Carol Mason, who has the disease even though she never worked a single day in a beryllium facility.

Day 1: Pages 7-12

STORIES BY SAM ROE ■ BLADE SENIOR WRITER

A LOOK AT THE SERIES

TODAY: The U.S. government has risked the lives of thousands of workers by knowingly allowing them to be exposed to unsafe levels of beryllium.

Tomorrow: A secret bargain between government and industry officials twists a plan to protect beryllium workers into a deal protecting themselves.

Tuesday: Brush Wellman, America's leading beryllium producer, has misled workers, federal regulators, and the public about the dangers of the metal.

Wednesday: Brush Wellman has systematically and aggressively tried to control how doctors, scientists, and the public view beryllium.

Thursday: The finals days of Marilyn Miller, who contracted beryllium disease while working as a secretary in a local beryllium plant.

Friday: Public officials are quick to give Brush Wellman millions of dollars in tax breaks and public money but slow to raise health concerns.

DEADLY ALLIANCE

Day 1: Weapons over workers

BLOCK NEWS ALLIANCE PHOTO BY ALLAN DETRICH

Three beryllium disease victims attend the funeral of Marilyn Miller, whose husband, Jack, is at center. With their oxygen tanks (from left) are Bob Szilagyi, Gary Renwand, and Butch Lemke. Like Mrs. Miller, all three contracted beryllium disease at a Brush plant.

Decades of risk

U.S. knowingly allowed workers to be overexposed to toxic dust

BY SAM ROE
BLADE SENIOR WRITER

Over the last five decades, the U.S. government has risked the lives of thousands of workers by knowingly allowing them to be exposed to unsafe levels of beryllium, a material critical to the production of nuclear weapons.

As a result, dozens of workers have contracted beryllium disease, an incurable, often-fatal lung illness.

In the Toledo area alone, at least 39 workers have contracted the disease after being exposed to levels of beryllium over the federal safety limit. Six of these workers have died.

A 22-month investigation by The Blade shows that the U.S. government clearly knew, decade after decade, that workers in the private beryllium industry were being overexposed to the hard, lightweight metal, which produces a toxic dust when manufactured or machined.

But federal officials continued to subsidize and encourage the industry to produce beryllium despite numerous government, scientific, and company reports showing that the material could not be made without putting workers in extreme danger.

Some workers were exposed to levels of beryllium dust 100 times above the safety limit, the government's own contemporaneous records show.

When safety regulators tried to protect workers, they ran up against an overwhelming alliance: the beryllium industry and the defense establishment.

Protection of the industry has reached all the way to the White House cabinet, where in the 1970s President Carter's Defense and Energy secretaries helped kill a safety plan.

They feared the plan would cut off beryllium supplies for weapons, and that would "significantly and adversely affect our national defense," U.S. Energy Secretary James Schlesinger wrote to two cabinet members at the time.

The Blade investigation, based on tens of thousands of court, industry, and recently declassified government documents, reveals a decades-long pattern of the government putting beryllium production and costs ahead of worker safety.

"The [government] cannot stand for a cessation of production," one federal official, Martin Powers, told colleagues in 1960 in response to health concerns.

Dr. Peter Infante, director of standards review for the U.S. Occupational Safety and Health Administration, says the government has done a poor job protecting beryllium workers.

"These are all deaths and disease that could have been prevented," Dr. Infante says. "That's the sad thing about it."

Victims question why the government risked their lives for weapons.

"We're killing ourselves trying to kill someone else," says Gary Renwand, a 61-year-old who contracted the disease at the country's largest beryllium plant, outside Elmore, O., 20 miles southeast of Toledo.

Among the local workers who have died:

Gary Anderson, a former Elmore high school football star.

Marilyn Miller, the wife of a dairy farmer in Bradner.

Ethel Jones, a Fremont, O., resident whose son, Eric Johnson, also contracted the disease.

Others have had their lungs so ravaged that they can no longer breathe on their own.

"If they had told me I'd end up hooked up to an oxygen tank my whole life I would have run away from the damn place," says Butch Lemke, who was overexposed at the Elmore plant and has been on oxygen for 15 years.

No one knows how many people have ever contracted the disease. Researchers estimate 1,200 documented cases nationwide and hundreds of deaths. But they say the disease often is misdiagnosed or goes undetected.

And it is difficult to determine how many victims have had exposures above the safety limit.

This much is clear: Beryllium disease has emerged as the No. 1 illness directly caused by America's Cold War buildup.

Disease by the numbers

1,200

Estimated number of documented cases of beryllium disease in America since the 1940s

1 in 11

Workers at the Elmore, O., beryllium plant who, according to a recent study, either have beryllium disease or an abnormal blood test

39

Number of local Brush workers who have contracted beryllium disease after documented overexposures

"I know of no other disease that we can document that is solely attributable to the work that we have conducted in the production of nuclear weapons," says Dr. Paul Seligman, director of the Energy Department's Office of Health Studies.

Among The Blade's findings:

■ Decade after decade, the government has knowingly allowed workers at privately operated beryllium plants in Ohio and Pennsylvania to be exposed to amounts of beryllium dust far above the U.S. safety limit. The plant outside Elmore, owned by Cleveland-based Brush Wellman Inc., has never consistently complied with the safety limit in all parts of the facility.

■ Production and costs have been put ahead of safety even when workers were in danger. In one case, federal officials said it was policy that saving money would come before safety when choosing some beryllium suppliers.

■ Safety enforcement by OSHA has been virtually nonexistent. Even though dozens of workers have contracted beryllium disease at the Elmore plant, several of whom have died, OSHA has conducted only one full inspection of the facility in the past 20 years.

■ Even though beryllium is a highly toxic material, the government has little idea which companies are using it, how many people are exposed, and whether they are being protected. This means thousands of Americans may be exposed to dangerous amounts of beryllium and not even know it.

■ Despite mounting illnesses and deaths, the government has not tightened exposure limits in 50 years. It has tried only once, and the Carter administration stepped in and helped kill the plan.

Long a strategic metal, beryllium is lighter than aluminum and six times stiffer than steel. It makes nuclear weapons more powerful, missiles fly farther, and jet fighters more maneuverable.

And it has been critical to the space program, having been used in the early Mercury missions, the space shuttle, and the Mars Pathfinder.

But when the metal is ground, sanded, or cut, and the resulting dust inhaled, workers often develop a disease that slowly eats away at their lungs. About a third with the illness eventually die of it.

Scientists still consider the illness mysterious – even bizarre. Tiny, invisible amounts of beryllium dust can be deadly; the federal exposure limit – 2 micrograms per cubic meter of air – is equivalent to the amount of dust the size of a pencil tip spread throughout a 6-foot-high box the size of a football field.

And while some people are unaffected by the dust, others get sick at seemingly insignificant exposures. So researchers think some people are genetically susceptible to the illness. Those individuals often develop the disease years after their last exposure to beryllium – up to 40 years later.

Federal officials have not been oblivious to the illness. Millions of dollars have been spent to improve safeguards and identify victims.

And it is unknown whether every single beryllium worker has been overexposed; the available exposure data are too sketchy.

Nor is it known precisely what constitutes a safe exposure. Exposures over the federal limit do not seem to guarantee illness, and exposures under the limit may not guarantee safety. In fact, more and more scientists think that people can get sick at levels under the limit.

What remains clear is that over the years, beryllium plants with close governmental ties have consistently exceeded the federally mandated safety limit with the government's full knowledge, and workers in those facilities have gone on to develop the disease.

Martin Powers, a former U.S. Atomic Energy Commission official in charge of obtaining beryllium for the government in the 1950s, says federal officials knew about the high exposures and tried to control them.

See **RISK**, *Page* **8**

Risk: *Despite mounting illness, government embraced beryllium*

Continued from **PAGE 7**

But he says the government did not want to shut the plants because that would mean stopping weapons production.

"What is the greater risk? To possibly expose people to health injury in the plant or shut down the national defense?"

Mr. Powers, who left the government to become a beryllium industry executive, says workers, at times, were put at increased risk for national security reasons.

"You know you are putting them at increased risk. You hope the risk doesn't materialize, doesn't become a reality."

The Energy Department, which is responsible for maintaining the nuclear weapons arsenal, says there are no substitutes for beryllium. So as long as America wants bombs, workers will face dangers.

"Building weapons is an extraordinarily risky process," the Energy Department's Dr. Seligman says.

'Building weapons is an extraordinarily risky process.'

Dr. Paul Seligman
director of the Energy Department's Office of Health Studies

Some victims say they knew there was a risk, but they didn't know they were being overexposed.

Brush Wellman, America's largest beryllium producer, says it has always posted air test results on plant bulletin boards and has discussed high exposures with employees.

But it acknowledges that by the time high dust counts are discovered, workers have already been overexposed.

MAGICAL METAL TURNS DEADLY

Discovered in France in 1798, beryllium wasn't produced commercially in America until the 1930s. When it was, it was extracted from beryl and bertrandite ores and processed through a series of chemical steps.

Among the first uses of beryllium: fluorescent lights. Workers coated the insides with beryllium-containing phosphors to help make the glass tubes glow.

At the time, beryllium dust was considered harmless. No one wore respirators, and no one appeared to be getting sick.

Then came World War II.

Suddenly, the U.S. government needed tons of beryllium for the top secret Manhattan Project, the $2 billion effort to build the world's first atomic bomb.

Beryllium plants signed government contracts and began shipping orders to Manhattan Project sites. To maintain the secrecy of the project, shipments were in unmarked packages, identified only by code names, such as Product 38.

"The word 'beryllium' should never be used," one government document warned.

In 1943, federal officials ran into a problem that threatened supplies: Beryllium workers, many in the Cleveland area, began developing a mysterious illness.

They were coughing, losing weight, and becoming breathless. Many recovered, but some grew sicker and died.

A Cleveland Clinic doctor concluded in 1943 that beryllium dust was toxic. But the U.S. Public Health Service, in a report that same year, thought some other agent was to blame.

As the controversy brewed, the government stepped up its beryllium orders. When the factories couldn't keep up, the government spent millions to expand them.

By the mid-1940s, dozens of people had become sick, both at Manhattan Project sites and in the fluorescent light industry.

And the mysterious disease was exhibiting a new twist. Researchers studying the fluorescent light industry concluded in 1946 that workers were getting sick months – even years – after their last exposure to beryllium. No one was recovering from this form of the illness, which would become known as chronic beryllium disease.

By now, most scientists and industry leaders agreed that beryllium dust was toxic.

The government recommended safety improvements and supplied respirators for some workers. But it was also deeply concerned about its image.

A 1947 secret report by the newly formed Atomic Energy Commission, or AEC, warned that the disease "might be headlined, particularly in non-friendly papers, for weeks and months – each new case bringing an opportunity for a rehash of the story. This might seriously embarrass the AEC and reduce public confidence in the organization."

Despite mounting sickness, the AEC remained "acutely interested in maintaining and expanding production of beryllium," according to the report, which was recently declassified.

The agency's mission – building nuclear weapons – depended on it.

"The AEC appears to be stuck with beryllium," the report said, "and hence stuck with the public relations problem."

DISEASE STRIKES LORAIN RESIDENTS

Just weeks after the government outlined its public relations fears in 1947, a tragedy began to unfold: People living near a beryllium plant in Lorain, O., started coming down with the disease.

One 28-year-old woman dropped to 85 pounds. Another became so weak she had to remain in bed.

Government officials were stunned. Never before had people been known to contract metal poisoning by living near a factory.

Fear in Lorain spread quickly. Citizens stormed a city council meeting, and Councilman Leo Svete had to pound the gavel for 15 minutes to restore order.

The AEC took air samples around the plant, and the Ohio Health Department announced it would conduct a rare and massive project: It would X-ray as many Lorain residents as possible.

X-ray stations were set up at schools, JC Penney, and Abraham Motor Sales. In all, 10,500 people were X-rayed – a fifth of the entire city.

And when the inquiry was over, 11 citizens who had never set foot in the plant were found to have the disease.

The wife of one worker got it by handling her husband's dusty work clothes. But the other victims, the AEC found, got it strictly from beryllium air pollution.

Among them: 7-year-old Gloria Gorka, a chubby girl with curly hair.

"We noticed she kept panting and had a hard time breathing when she exerted herself in the least little way," recalls her father, Joseph, an 81-year-old now living in Florida. "We just thought she was having a hard time getting over the measles."

When her schoolteacher called and said Gloria was having difficulty walking up one flight of stairs at school, her parents took her to a doctor. But there was nothing anyone could do.

"It was so sad," recalls her 79-year-old aunt, Angela Barraco. "By the time she died she was nothing but skin and bones."

AEC officials concluded that the victims had been exposed to surprisingly minute levels of beryllium. They recommended that citizens should no longer be exposed to more than .01 micrograms per cubic meter of air – an amount invisible to the naked eye.

The limit was the first air pollution standard in American history.

As for the limit inside beryllium plants, officials weren't sure what to do. They discussed the matter for weeks, and then an AEC health official and a medical consultant to the fluorescent light industry settled on 2 micrograms while riding in a taxi.

This limit, based largely on guesswork, was dubbed "the taxicab standard."

Officials knew workers might become ill at lower levels, a 1958 AEC report states, but "because of the relatively small numbers of people involved," it was seen as "an acceptable risk."

COSTS MADE A PRIORITY OVER WORKER SAFETY

Publicly, the government was cracking down.

While the AEC was setting limits on pollution, the U.S. Public Health Service was convincing fluorescent light companies to stop using beryllium.

Government officials issued warnings about the lights already in use: Children shouldn't use them as lances, and burned-out tubes should be broken under water.

But unbeknownst to the public, the government was embracing beryllium, ordering more for weapons.

In fact, in 1949 the AEC adopted a policy that weapons production and economics would come before worker safety when the United States was choosing some beryllium suppliers.

One top official who was upset about this, records show, was Wilbur Kelley, manager of the AEC's New York office.

In the summer of 1949, he and his staff were concerned that the government was planning to buy beryllium hydroxide – the vital feed material for all beryllium products – from a plant outside Reading, Pa., operated by the Beryllium Corporation.

Mr. Kelley had reason to be concerned: Dust in the plant was hazardously high, and several workers had died.

In a series of letters, Mr. Kelley pleaded with his AEC colleagues not to buy

See **RISK**, *Page* **9**

Risk: *Policy put production, costs over workers' safety*

Continued from **PAGE 8**

beryllium from the firm.

"The AEC cannot avoid knowing that every time it enters into a contract for the production of beryllium in what it knows to be a medically unsafe plant the lives of an unknown number of people may be placed in jeopardy," he wrote.

The government, he wrote, "cannot shirk its moral responsibility in this matter."

But at a meeting of top AEC officials in Washington, Mr. Kelley was informed that, except in certain contracts, the government would no longer bear "the responsibility for health conditions associated with the procurement and production of beryllium materials," minutes of the meeting state.

It was decided that "further consideration of medical reasons would be dropped and that all consideration of the proposed arrangement with the Beryllium Corporation would be based strictly on economics."

It is unclear whether the AEC went ahead and bought beryllium from the Beryllium Corporation. But the government continued its association with the firm.

The AEC owned a small building on plant grounds that cast beryllium metal. The Beryllium Corporation ran the casting operation under a government contract.

For the next 20 months, from the summer of 1949 to the spring of 1951, workers in that building were exposed to dust up to 100 times the safety limit, records show.

Conditions in Beryllium Corporation's main plant were worse: Some workers were exposed to dust 500 times the limit.

And many people went on to get beryllium disease.

PHOTO SPECIAL TO THE BLADE

When Gloria Gorka (about 2 years old above) began having difficulty breathing, her parents thought she was just having trouble getting over the measles. But scientists concluded she had contracted beryllium disease, caused by air pollution from a beryllium plant. Gloria died at age 7.

See **RISK**, *Page* **10**

Risk: *Beryllium plants kept open despite dangers*

Continued from **PAGE 9**

In fact, in the 10 years following Mr. Kelley's repeated warnings about the Beryllium Corporation, at least 37 people either working at the plant site or living nearby developed the illness, studies show.

Among them: a woman who paid weekly visits to a relative's grave in the cemetery across the street from the plant.

PLANTS KEPT OPEN DESPITE DANGERS

The 1950s brought the Korean War and the arms race, the Cold War and the space race. America's desire for beryllium had never been greater.

The government didn't want a repeat of the Lorain neighborhood tragedy, and so it paid Brush Beryllium, the predecessor to Brush Wellman, to build and operate a plant far from residents.

The site: tiny Luckey, a farming community 15 miles south of Toledo. Here, only one or two farmhouses would be near.

And for the first time, the government had a safety standard – the one adopted in 1949 – to limit the amount of dust workers could be exposed to.

But year after year, records show, dust counts in the Luckey plant were high. Workers were even overexposed in the lunchroom.

Instead of closing the plant, the government eased enforcement of the rules, allowing workers to be exposed to levels five times higher than previously permitted.

But even with the relaxed rules, the plant couldn't keep the dust under control.

Eight years later, in 1957, the plant was replaced by a larger one 10 miles away near Elmore.

Under government contract, Brush Beryllium built, owned, and operated the plant. In return, the government agreed to buy 50 tons of beryllium over five years. The AEC signed a similar contract with the Beryllium Corporation for a plant outside Hazleton, Pa.

Both contracts had a health clause: If dust levels were consistently high, the government could close the plants.

Again, workers were overexposed throughout the 1950s and 1960s, industry and government records show. Dust counts at Elmore were regularly five times too high; some levels at Hazleton were 4,000 times over the limit.

Yet the Elmore plant was never shut, and the Hazleton plant was closed only once for about a month, according to a deposition by Mr. Powers, the former government and industry official.

The beryllium companies tried to meet the safety limit but to no avail. A Brush doctor blamed the failure on production demands, "triggered primarily by the space program."

One Brush document says every time the government considered closing the Elmore plant, "the Navy and AEC weapons people objected because they needed the metal for nuclear weapons and Polaris [missile] parts."

AEC officials, correspondence shows, weren't sure what to do about the high exposures.

One official wrote that better equipment had been suggested, but "this would increase the cost of beryllium by ten times," and "the plants would have to be shut down and rebuilt."

"The extra cost would be undesirable, but the latter factor is unacceptable because of AEC need for the metal."

Still, as bad as the dust counts were, they were improving and the disease rate appeared to be dropping. In fact, some officials thought the exposure rules might be too strict.

In 1960, a dozen AEC officials met to discuss the issue. They concluded that the plants, dangerous or not, must remain open, minutes of the meeting show.

"The [government] cannot stand for a cessation of production," one official stated.

That official was Martin Powers, in charge of buying beryllium for the AEC. But he was also responsible for ensuring that the beryllium plants were not overexposing workers.

Four months after this meeting, Mr. Powers left the government to work for one of the firms he had been responsible for monitoring: Brush Beryllium.

He would spend the next 26 years as a top executive with the company, often handling the government contracts and overseeing the health and safety program.

Today, Mr. Powers, 77, is retired from Brush but remains a paid company consultant. The government, he says, didn't know for sure that workers were going to be harmed by the overexposures. But he acknowledges the AEC was taking a risk that they might.

"I think there were certainly cases where you might have allowed marginal activities to exist hoping – but not really knowing – that they were going to be all right."

He says pressure on the AEC to keep plants running was enormous. He recalls receiving a phone call from an admiral who was livid about AEC plans to phase out a plant.

"This admiral called me and said, 'You will not shut that goddamn plant down. What are you, out of your goddamn-picking mind? I've got submarines out there. We need missiles.' "

Mr. Powers says he didn't agree with some government decisions. He says that the AEC for one or two years, about 1949 and 1950, insisted that Brush not put warning labels on beryllium products shipped to AEC facilities because it didn't want to alarm workers there.

Officials who made that decision, he says, "just didn't apparently feel it was their province to worry about the health issues."

Numerous workers would eventually develop beryllium disease after being overexposed in the 1950s and 1960s.

Among them: Gary Renwand, an Oak Harbor, O., resident who worked 35 years at Brush's Elmore plant.

Company records show that he was frequently exposed to high levels of dust

See **RISK**, *Page* **11**

Risk: *Safety plan hits strong opposition*

Continued from **PAGE 10**

– some amounts five times the safety limit.

Now, he is often in and out of St. Charles Mercy Hospital, battling heart and lung problems related to his disease. On one such day, he sits up in bed and recalls making beryllium re-entry shields for space capsules and watching the capsules on TV careen back to Earth.

"I thought, 'Hey, we made that shield.' And I was proud. I was part of this. A new era."

He forces a laugh.

"Young and dumb," he says.

SAFETY PLAN FOUGHT; SECRET BARGAIN CUT

Only once in the last five decades has the U.S. government tried to tighten exposure limits.

That was in 1975, when OSHA proposed cutting the exposure limit in half – from 2 micrograms per cubic meter of air to 1.

The plan met tremendous opposition from the beryllium industry and U.S. weapons officials. Energy Secretary James Schlesinger warned that the plan might drive beryllium firms out of the metal business and cut off U.S. supplies.

"The loss of beryllium production capability would seriously impact our ability to develop and produce weapons for the nuclear stockpile and, consequently, adversely affect our national security," he wrote in 1978 to Labor Secretary Ray Marshall and Health, Education, and Welfare Secretary Joseph Califano, Jr.

Secretary Schlesinger wanted the scientific basis for the plan reviewed. Defense Secretary Harold Brown made a similar request.

So the plan was delayed until outside experts could review it. In the end, the experts concluded that the science behind the safety plan was indeed valid.

But the plan never went through.

One factor: In 1979, the Cabot Corp., now the owner of the beryllium plant outside Hazleton, Pa., quit making beryllium metal, leaving Brush Wellman as the sole U.S. supplier.

Almost immediately, the government cut a secret deal with Brush, according to government and industry records. Brush promised to continue to supply the Energy Department with beryllium for its weapons; in return, the agency promised to:

- Pay Brush a one-time 35 per cent price increase.
- Not develop other sources of beryllium.
- Try to persuade OSHA to drop its safety plan.

Within a few years, OSHA's safety plan died.

Throughout the fight, one thing remained constant: Workers continued to be overexposed.

PLANTS RARELY INSPECTED; METAL'S USE NOT TRACKED

Today, more than 50 years after the disease was discovered, the rate of illness is higher than ever.

A study published in 1997 found that 1 in 11 workers at the 646-employee Elmore plant either have the disease or an abnormal blood test – a sign they may very well develop the illness.

And while dust counts at the Elmore plant are much improved, some remain over the legal limit, company records turned over in court cases show.

OSHA is responsible for inspecting the plant and making sure dust counts are low. If not, inspectors can write citations and issue fines.

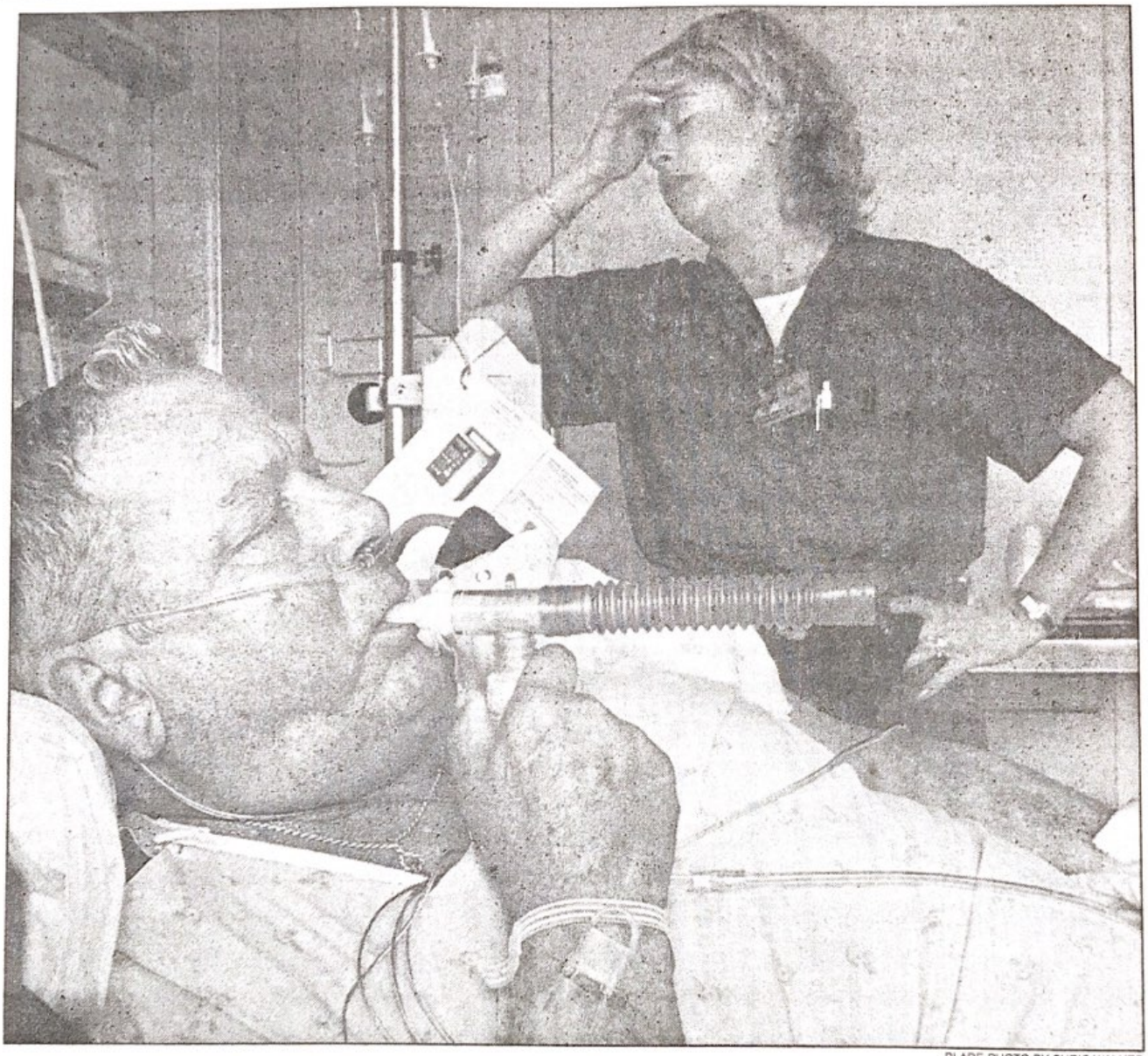
But years have gone by without an inspector setting foot in the plant, OSHA records show.

When inspectors have found high dust counts, Brush Wellman has escaped penalties.

In fact, OSHA records show, Brush has never paid one cent for high exposures at any of its several facilities nationwide.

OSHA officials says there are simply not enough inspectors to regularly check the plants.

"We have about 2,000 compliance offi-



BLADE PHOTO BY CHRIS WALKER

Gary Renwand uses an inhaler at St. Charles Mercy Hospital. He contracted beryllium disease at Brush's Elmore plant, where he helped produce beryllium for U.S. weapons. Records show he was repeatedly exposed to levels of beryllium dust five times the safety limit. He says: 'We're killing ourselves trying to kill someone else.'

cers to cover 6 million work sites that employ more than 100 million workers," says OSHA spokesman Stephen Gaskill, who recently left the agency.

"So to say that we are spread thin is a severe understatement."

To make matters worse, no one knows what companies – from large corporations to small machine shops – are handling beryllium and whether safeguards are in place.

"There are beryllium-copper golf clubs now being used," says Dr. Peter Infante, OSHA's director of standards review. "Where are those being tooled and polished?"

Thousands of companies are believed to handle beryllium, but no one knows how many workers are potentially exposed. Estimates range widely, from 30,000 to 800,000.

Improvements, officials say, are in the works.

The Energy Department says it is spending millions to improve ventilation and air monitoring at government-owned sites. And Brush Wellman says it is improving equipment and work practices to reduce exposure.

Theresa Norgard, wife of disease victim Dave Norgard, of Manitou Beach, Mich., says she has heard such promises before.

"Tired, worn-out phrases," she says. "Different time periods, same messages: 'Mistakes were made. Now we're doing better. We're doing everything we can.' "

Time and time again, she says, the government sacrificed the workers.

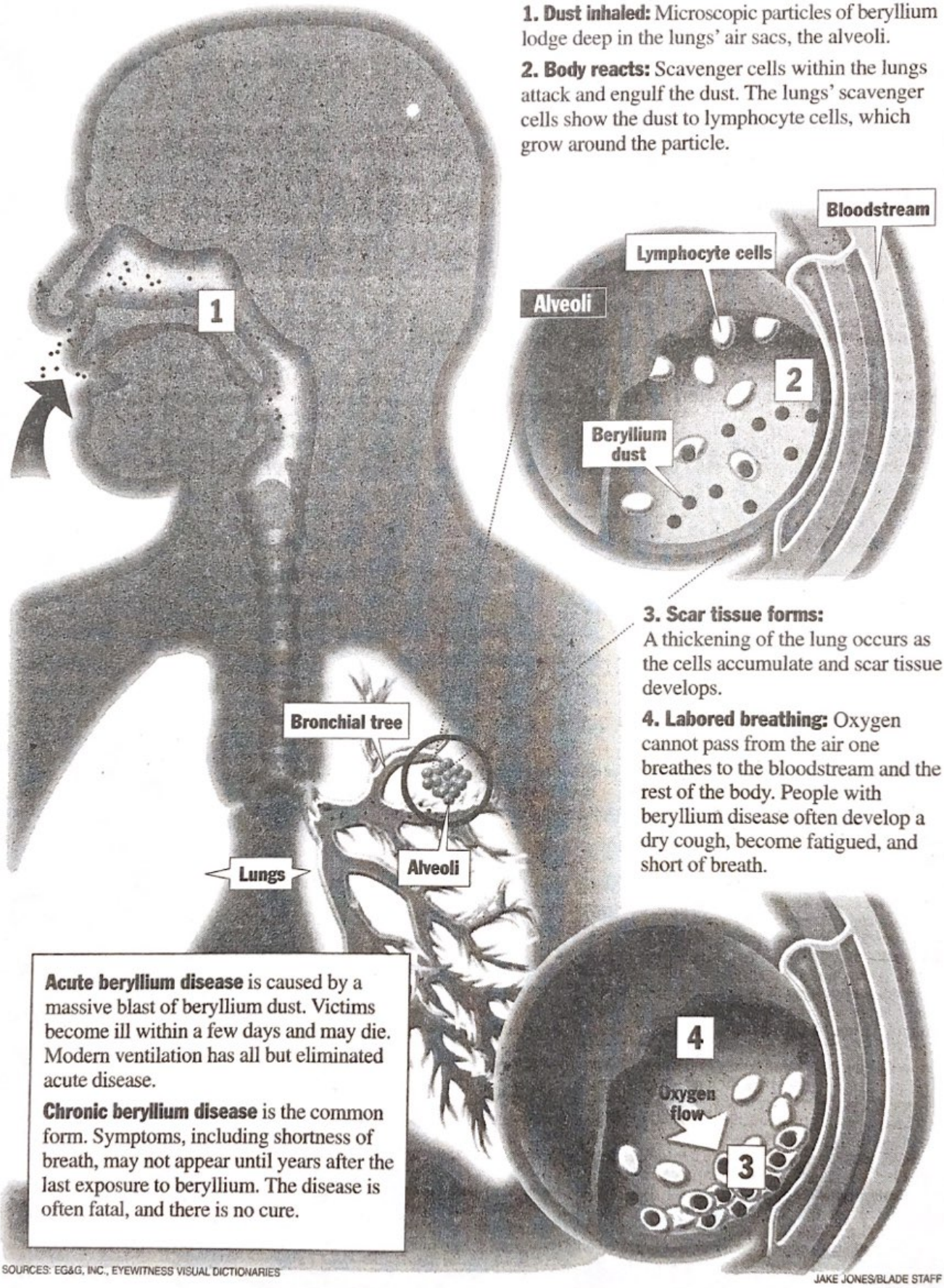
"They were just like pieces of equipment. They were disposable. They were dispensable. They weren't even seen as being human."

ATTACKING THE LUNGS

Here's a look at the effects of beryllium dust on the body's respiratory system:

1. Dust inhaled: Microscopic particles of beryllium lodge deep in the lungs' air sacs, the alveoli.

2. Body reacts: Scavenger cells within the lungs attack and engulf the dust. The lungs' scavenger cells show the dust to lymphocyte cells, which grow around the particle.



3. Scar tissue forms: A thickening of the lung occurs as the cells accumulate and scar tissue develops.

4. Labored breathing: Oxygen cannot pass from the air one breathes to the bloodstream and the rest of the body. People with beryllium disease often develop a dry cough, become fatigued, and short of breath.

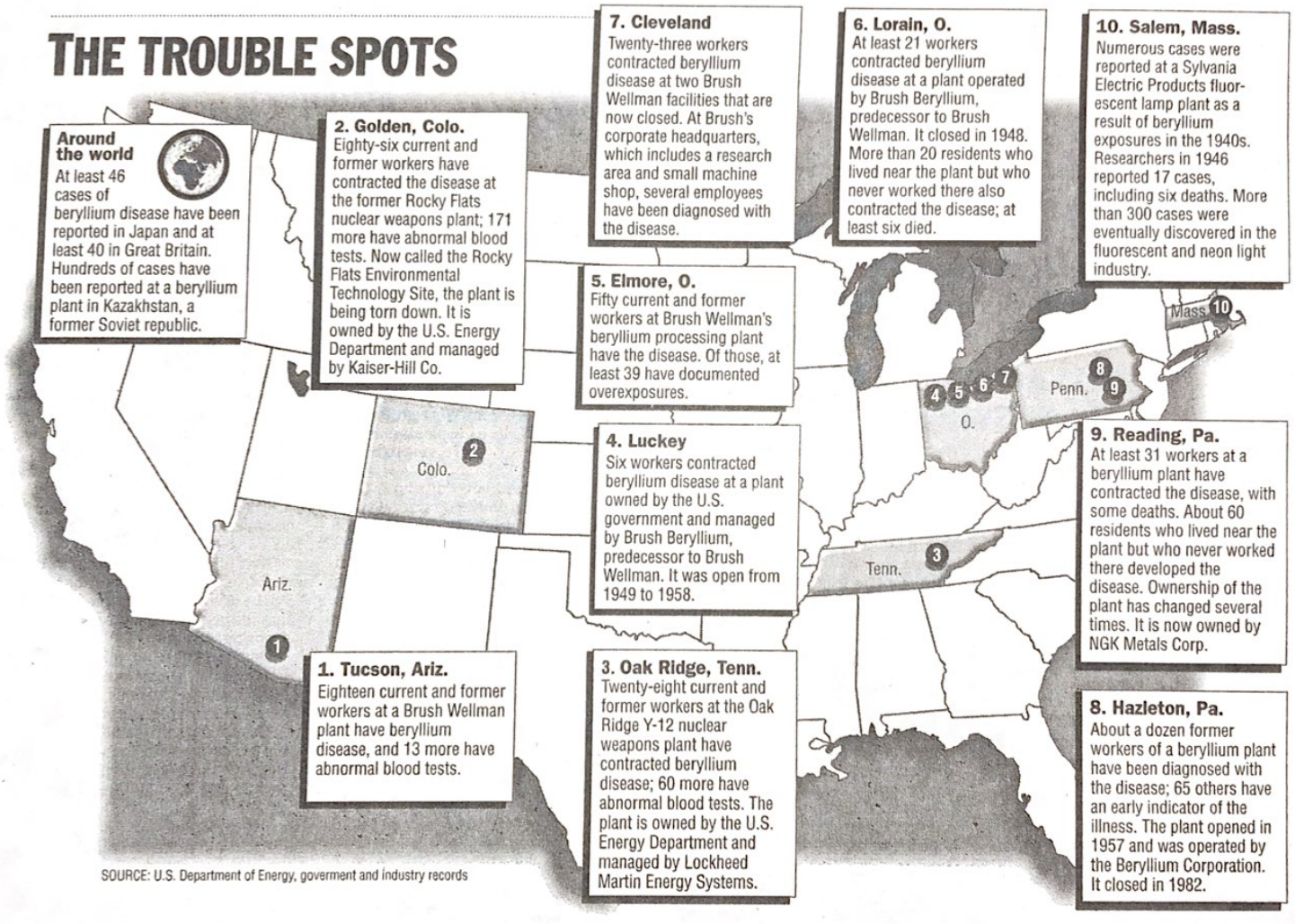
Acute beryllium disease is caused by a massive blast of beryllium dust. Victims become ill within a few days and may die. Modern ventilation has all but eliminated acute disease.

Chronic beryllium disease is the common form. Symptoms, including shortness of breath, may not appear until years after the last exposure to beryllium. The disease is often fatal, and there is no cure.

SOURCES: EG&G, INC., EYEWITNESS VISUAL DICTIONARIES

JAKE JONES/BLADE STAFF

THE TROUBLE SPOTS



Around the world
At least 46 cases of beryllium disease have been reported in Japan and at least 40 in Great Britain. Hundreds of cases have been reported at a beryllium plant in Kazakhstan, a former Soviet republic.

1. Tucson, Ariz.
Eighteen current and former workers at a Brush Wellman plant have beryllium disease, and 13 more have abnormal blood tests.

2. Golden, Colo.
Eighty-six current and former workers have contracted the disease at the former Rocky Flats nuclear weapons plant; 171 more have abnormal blood tests. Now called the Rocky Flats Environmental Technology Site, the plant is being torn down. It is owned by the U.S. Energy Department and managed by Kaiser-Hill Co.

3. Oak Ridge, Tenn.
Twenty-eight current and former workers at the Oak Ridge Y-12 nuclear weapons plant have contracted beryllium disease; 60 more have abnormal blood tests. The plant is owned by the U.S. Energy Department and managed by Lockheed Martin Energy Systems.

4. Luckey
Six workers contracted beryllium disease at a plant owned by the U.S. government and managed by Brush Beryllium, predecessor to Brush Wellman. It was open from 1949 to 1958.

5. Elmore, O.
Fifty current and former workers at Brush Wellman's beryllium processing plant have the disease. Of those, at least 39 have documented overexposures.

6. Lorain, O.
At least 21 workers contracted beryllium disease at a plant operated by Brush Beryllium, predecessor to Brush Wellman. It closed in 1948. More than 20 residents who lived near the plant but who never worked there also contracted the disease; at least six died.

7. Cleveland
Twenty-three workers contracted beryllium disease at two Brush Wellman facilities that are now closed. At Brush's corporate headquarters, which includes a research area and small machine shop, several employees have been diagnosed with the disease.

8. Hazleton, Pa.
About a dozen former workers of a beryllium plant have been diagnosed with the disease; 65 others have an early indicator of the illness. The plant opened in 1957 and was operated by the Beryllium Corporation. It closed in 1982.

9. Reading, Pa.
At least 31 workers at a beryllium plant have contracted the disease, with some deaths. About 60 residents who lived near the plant but who never worked there developed the disease. Ownership of the plant has changed several times. It is now owned by NGK Metals Corp.

10. Salem, Mass.
Numerous cases were reported at a Sylvania Electric Products fluorescent lamp plant as a result of beryllium exposures in the 1940s. Researchers in 1946 reported 17 cases, including six deaths. More than 300 cases were eventually discovered in the fluorescent and neon light industry.

SOURCE: U.S. Department of Energy, goverment and industry records

THE GOVERNMENT'S CHOICE

Since the 1940s, the government has wrestled with the problem of how to balance the health dangers of beryllium production with its need for the metal for weapons and the space program.

'In the work of the Atomic Energy Commission, beryllium has unique properties which preclude the possibility of substituting some other material for it. Unless the experts change their mind as to its importance, the AEC appears to be stuck with beryllium and hence stuck with the public relations problem.'

– from a 1947 U.S. Atomic Energy Commission report titled 'Public Relations Problems in Connection With Occupational Diseases in the Beryllium Industry'

'The procurement of beryllium hydroxide from the Beryllium Corporation would be a complete reversal of policy concerning the production of beryllium products for the Commission in a plant which is medically unsound.... Although the Commission would probably not be legally responsible for damages, it cannot shirk its moral responsibility in this matter.'

– Wilbur Kelley, manager of the Atomic Energy Commision's New York office, to W.J. Williams, an AEC production director, on July 18, 1949

'[The AEC will no longer bear] the responsibility for health conditions associated with the procurement and production of beryllium materials for the AEC, except where cost contracts were involved.... Mr. Williams then stated that further consideration of medical reasons would be dropped and that all consideration of the proposed arrangement with the Beryllium Corporation would be based strictly on economics.'

– Minutes of July 20, 1949, meeting of top AEC officials, including Mr. Kelley

'The Commission cannot stand for a cessation of production.'

– The Atomic Energy Commission's Martin Powers, at an AEC meeting Aug. 3, 1960, discussing whether plants overexposing workers should be shut down

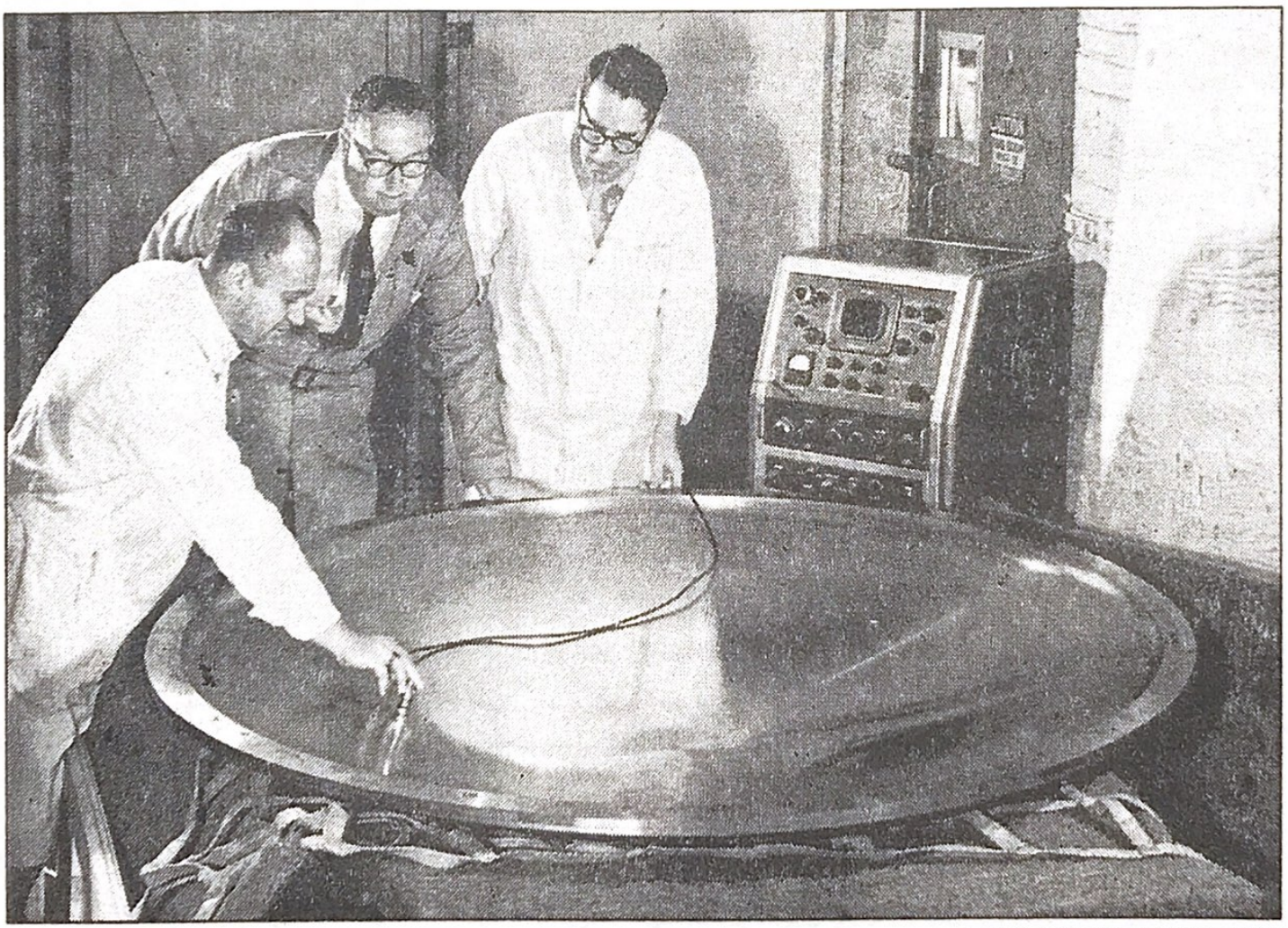


PHOTO COURTESY OF BRUSH WELLMAN

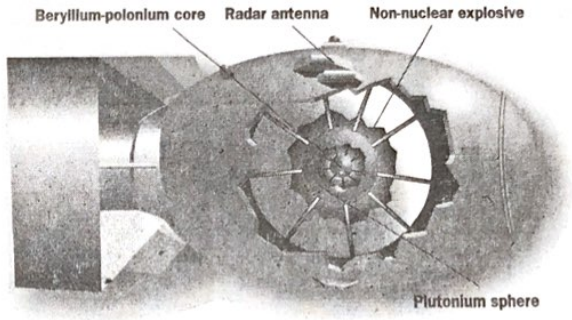
Beryllium was an essential metal during the Cold War. Among the uses: heat shields (above) for the Mercury manned flight program.

DEADLY ALLIANCE

Day 1: Weapons over workers

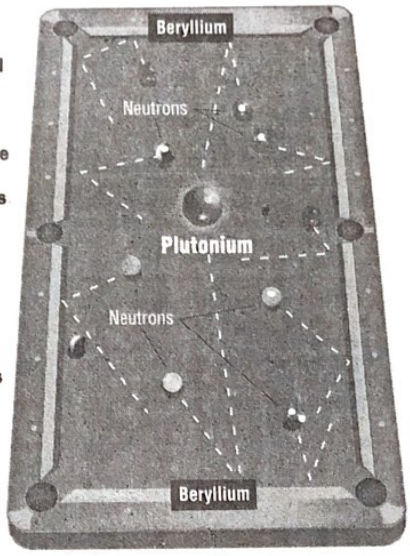
A SPACE AGE METAL

Because of beryllium's rare properties, it is used in jet fighters, the space shuttle, missiles, the Hubble Space Telescope, and nuclear weapons. The U.S. Energy Department no longer produces nuclear weapons, but it needs beryllium for replacement parts.



A bigger bang:

Beryllium allows nuclear weapons to be smaller and lighter yet more powerful and efficient.
A layer of the metal is placed around a fissionable material, such as plutonium. High explosives squeeze the plutonium down to a critical mass. Neutrons are introduced, and the plutonium atoms split exponentially in a chain reaction. Like the cushions on a pool table, beryllium bounces excess neutrons back to the plutonium so the chain reaction is more efficient.



Sources: U.S Department of Energy, Brush Wellman Inc., World Book Encyclopedia

DEADLY ALLIANCE

Day 1: Weapons over workers

Atomic bomb scientists among early victims

BY SAM ROE
BLADE SENIOR WRITER

Factory workers aren't the only ones who have developed beryllium disease. Numerous scientists have contracted the illness, some of whom handled beryllium while working on the top secret Manhattan Project.

Among those who have died: Dr. Herbert Anderson, a physicist who was instrumental in developing the world's first atomic bomb.

"In his last years he couldn't do anything without an oxygen tank strapped to his back," recalls Dr. Theodore Puck, a longtime friend and cancer researcher.

Dr. Anderson's widow, Betsy, recalls how steroids extended his life but caused his bones to become painfully brittle.

"By the time he died, you could break his fingers by shaking his hand."

Yet Dr. Anderson continued his research work – even while bedridden – until his death in 1988. His wife says he never regretted working with beryllium nor viewed the disease as an obstacle.

"He felt it was unfortunate it had happened, but he looked at it as science, as one more discovery."

Many of America's top scientists were exposed to beryllium dust during the Manhattan Project, the $2 billion effort during World War II to create the bomb.

Because of the metal's special properties, tons of it were shipped to top secret government locations, such as Los Alamos, N.M. There, scientists sawed, drilled, and ground it – creating deadly dust as they did.

This was before the hazards of beryllium were fully understood, and so few wore respirators.

Dr. Anderson's widow recalls how her husband used to grind beryllium like flour. "He used to sit there and pound it with a mortar and pestle and breathe in the particles."

PHOTO COURTESY LAWRENCE BERKELEY NATIONAL LABORATORY

Physicist Eugene Gardner (right) at work with fellow scientist C.M.G. Lattes in 1948. Mr. Gardner died two years later at age 37 of beryllium disease, spending his last months inside an oxygen tent.

So like the factory workers in the big beryllium plants in Ohio and Pennsylvania, scientists and research assistants also developed beryllium disease.

At least 19 cases were reported at the Massachusetts Institute of Technology, government records show. Other cases occurred at Los Alamos, the University of Chicago, and the Battelle Memorial Institute in Columbus.

In all, more than 50 people developed beryllium disease while working on the bomb and other early government projects.

Victims include physicist Eugene Gardner, co-discoverer of the first man-made mesons, particles with masses between electrons and protons.

Dr. Gardner died in 1950 at age 37, spending the last few months of his life in an oxygen tent, a microscope at bedside so he could continue his research.

> **'He had this awful, scary feeling that he was drowning slowly.'**
>
> *Betsy Anderson*
> widow of atomic bomb scientist
> Dr. Herbert Anderson

Beryllium victim Dr. Anderson was a close associate of Enrico Fermi, the Nobel Prize-winning physicist. Along with about 40 other scientists, Dr. Anderson helped Fermi produce the first nuclear chain reaction, performed in a squash court at University of Chicago's Stagg Field in 1942.

It wasn't until several years later, while playing tennis, that Dr. Anderson noticed his health was failing. "He was gasping, gasping, and finally couldn't get through a game," his widow says.

Dr. Anderson, then about 35 years old, was diagnosed with beryllium disease and put on a strict regimen of steroids. They helped, but his lungs continued to deteriorate.

"He had this awful, scary feeling that he was drowning slowly," Ms. Anderson recalls.

He tried to stay fit by swimming and convinced the federal government to build him a one-lane, indoor pool at his New Mexico home.

"This wasn't the result of a lawsuit," Ms. Anderson says, "but him saying to them: 'I've been an important part of your program. Don't you think this would be the honorable thing to do?' "

Despite his disease, Dr. Anderson continued to work with beryllium, which was important in his experiments in particle physics. His wife even embroidered beryllium's atomic symbol on the back of a shirt for his birthday.

She says he only had one regret involving beryllium – the time he accidentally sliced off the end of his finger. He calmly picked it up and drove to the hospital, only to have the doctor ask him if he would donate it to science instead of having it sewn back on. The doctor wanted to check it for beryllium deposits.

Dr. Anderson agreed. The doctor ran the finger through numerous tests but found no beryllium.

"This he regretted – losing the end of his finger on an experiment he didn't think was very good," she says.

Dr. Anderson died at age 74. During his final days, he worked from his bed on a cancer-related paper.

"I felt privileged to go through his death," says Ms. Anderson, a physics research technician. "He was absolutely courageous and absolutely rational and ready for what came next. Ever the scientist – explaining what was happening and what he felt."

DEADLY ALLIANCE

Day 1: Weapons over workers

Dust to dust

Coal town hit hard by black lung now struggles with beryllium disease

BY SAM ROE
BLADE SENIOR WRITER

HAZLETON, Pa. – For decades, this old coal town in the northern reaches of Appalachia was hit hard by black lung.

Scores of miners developed the disease by breathing in the dangerous dust. Fathers got it. Sons got it. And, sometimes, their sons got it.

"Between the mine explosions and black lung, good portions of families were wiped out," resident Carmen Fornataro says.

Now, residents are suffering from another deadly dust: beryllium.

"The beryllium plant was supposed to be high-tech and safer than the mines," former employee Carol Zamba says. "The only difference was that this dust you couldn't see; so people didn't think it was dangerous."

About a dozen people here have been diagnosed with beryllium disease, an incurable lung ailment caused by inhaling microscopic bits of beryllium.

Sixty-five others have abnormal X-rays or blood tests that are consistent with the illness, a recent study shows. That's about 15 per cent of the former beryllium workers tested – one of the highest rates ever found.

"We were expecting 5 per cent at the most," says Dr. Kenneth Rosenman, a professor of medicine at Michigan State University.

The good news is that people in Hazleton are no longer being exposed to the dangerous metal: The local plant closed in 1982.

But because beryllium disease often takes years to appear, cases continue to be discovered among former workers.

Ironically, beryllium came to this town of 25,000 in eastern Pennsylvania with great fanfare.

The year was 1957, when area coal mines were all but depleted. Unemployment had soared to 25 per cent.

Civic boosters started wooing outside business, landing the Beryllium Corporation, a firm that had just signed a major U.S. defense contract and needed to expand.

By then, the hazards of beryllium were clearly known. In fact, Beryllium Corporation's plant just outside Reading, 40 miles to the south, had recorded several deaths from beryllium disease.

Still, Hazleton leaders welcomed a beryllium plant.

"I didn't think I was putting people in danger," recalls Dr. Edgar Dessen, the then-chamber of commerce president who helped bring the plant to Hazleton. "I felt I was doing the proper thing, medically and morally."

Now 82 years old and a retired radiologist, Dr. Dessen says he was assured the plant would be safe and closely monitored by the U.S. Atomic Energy Commission.

"They had very stringent rules," he says.

The business moved into an old, horseshoe-shaped building outside of town. Dignitaries posed for pictures. The local paper proclaimed Hazleton was entering "the atomic age." And workers lined up for jobs.

"Holy God! Everyone and their brother wanted to work there," says Mr. Fornataro, one of the first machinists hired.

The 69-year-old says workers were told that beryllium was hazardous, but they didn't seem to care.

"People were so desperate for jobs, it didn't mean a thing," says Mr. Fornataro, who was diagnosed with beryllium disease in 1988.

Like the plant outside Reading, the Hazleton factory had high amounts of beryllium dust in the air, government and scientific reports show. Some dust counts were 4,000 times the safety limit.

Former plant secretary Ms. Zamba recalls wiping dust off her desk every morning.

"Had I known I would be exposed, even in an office atmosphere, I would not have taken a job there."

Luckily, she says, she didn't develop the disease.

Al Matusick wasn't so fortunate. He was diagnosed in 1983. He now has a chronic cough and shortness of breath.

He recalls how workers often had to be evacuated from the plant.

"There were powder spills – I mean huge ones," the 67-year-old says. "It would take 24 hours for the dust to settle."

In 1985, Mr. Matusick and other victims sued then-owner Cabot Corp., but the suit was dismissed because they couldn't prove they were intentionally harmed.

Cabot, a Boston-based chemical firm, declined to comment. It tore down the plant a few years ago but still owns the land.

Mr. Matusick is still fighting the company, and he takes a visitor out to the old plant site to show why.

Down a winding, gravel road, past strip mines and slag heaps, is a large pond. There, dozens of dead, pale trees stick out of the black water.

"Look how dead everything is," Mr. Matusick says. "It's gruesome."

He blames runoff from the nearby beryllium site, but health officials say drainage from abandoned coal mines – not beryllium – is killing off the life.

Perhaps the most frustrating issue for victims here is workers' compensation, the insurance system for workers injured on the job.

Under Pennsylvania law, workers must file claims within 300 weeks of leaving their jobs.

But beryllium disease can take up to 40 years to appear.

Mr. Fornataro, for example, left the beryllium plant in 1974, but his disease did not appear until 1988 – 14 years later.

So when he filed a workers' compensation claim, he was rejected because the statute of limitations had run out. He appealed in the Pennsylvania courts, but to no avail.

"It's the most ridiculous thing," he says. "How could somebody file for a disease when they don't know they have it?"

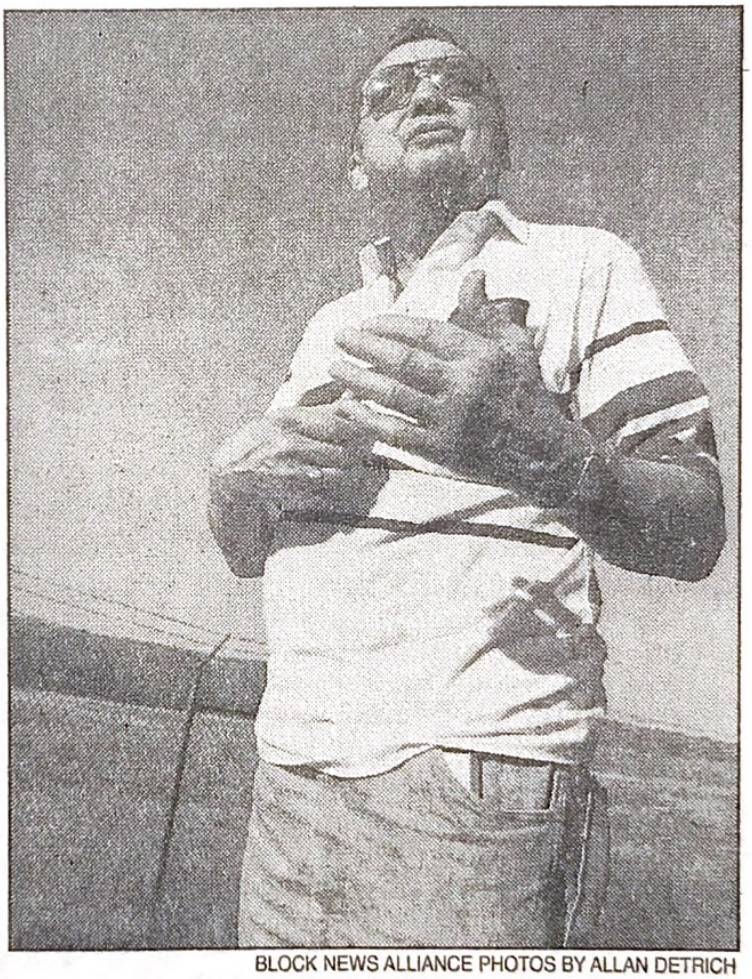
Dr. Rosenman, the Michigan State researcher, agrees. In most states, he says, the statute-of-limitations clock does not start ticking until victims discover they have the disease. Not so in Pennsylvania.

"A backward, inadequate law," he says.

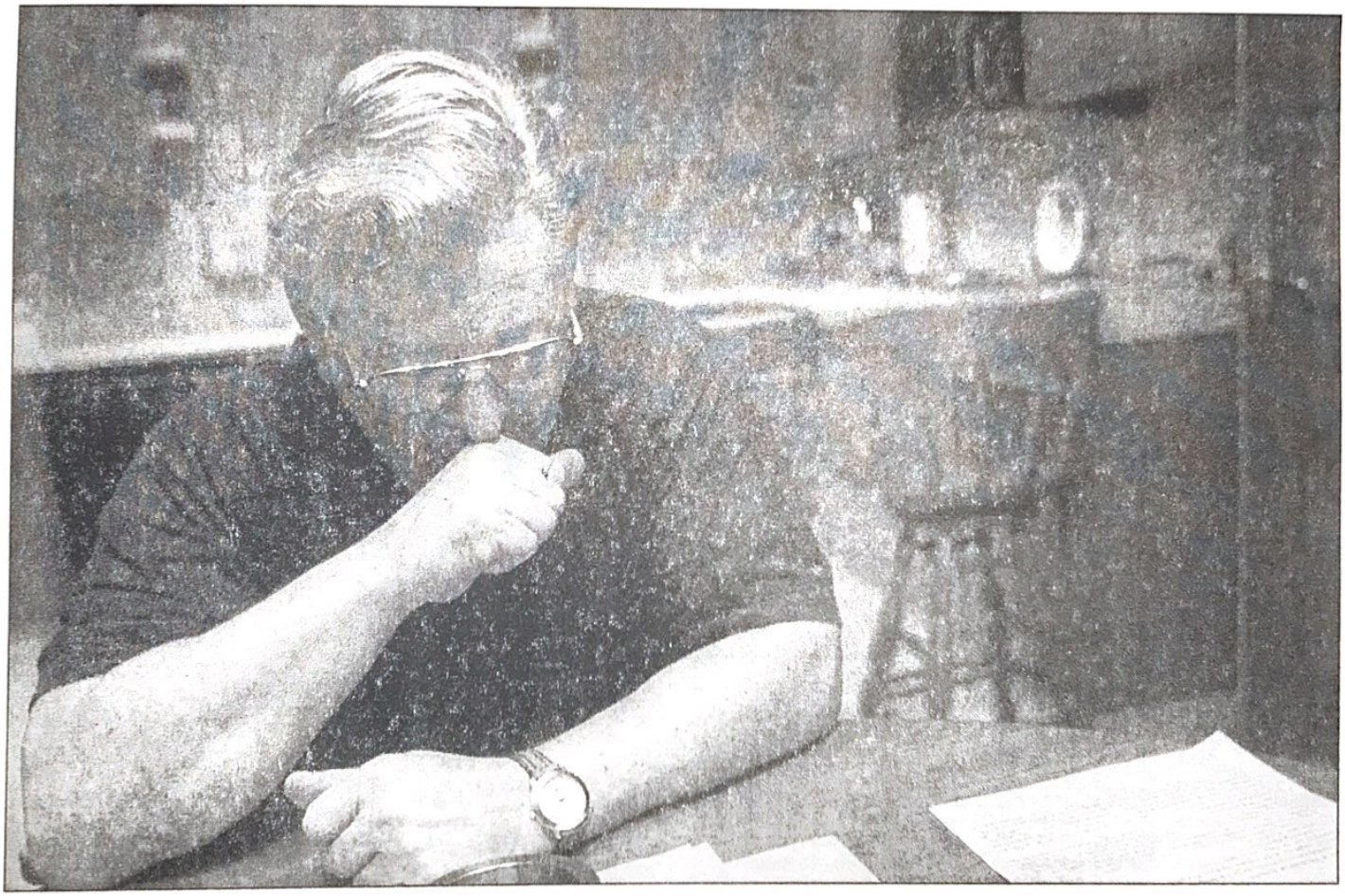
Some residents say Hazleton would have been better off if the beryllium plant had never come to town.

"This was going to place Hazleton on the map, and people were going to be able to make big money, and live a life of grandeur," says Ms. Zamba, the former secretary. "It put Hazleton on the map, but in a very negative way."

BELOW: Another Hazleton worker and beryllium victim, Al Matusick, visits the razed site of the former plant.



BLOCK NEWS ALLIANCE PHOTOS BY ALLAN DETRICH



LIVING WITH DISEASE

LEFT: Carmen Fornataro was one of the first machinists hired at the beryllium plant at Hazleton, Pa. He says people were desperate for good-paying jobs in the coal-mining town that had been hard hit by black lung and mine explosions. Mr. Fornataro was diagnosed with beryllium disease in 1988.

DEADLY ALLIANCE

Day 1: Weapons over workers

Casualties without bullets

Many workers at government sites feel betrayed

STORY BY SAM ROE ■ PHOTOS BY ALLAN DETRICH

GOLDEN, Colo. – Bill Fletcher eases his pickup off the highway and points across the barbed wire fence and windswept mesa to what appears to be a small town in the distance.

"Unless you knew it was here, you'd drive right by and never know it," he says.

The collection of buildings is the old Rocky Flats nuclear weapons plant. Here, Mr. Fletcher and thousands of others built bombs during the Cold War, making it one of the U.S. government's most secret facilities.

And here, Mr. Fletcher and dozens of others contracted beryllium disease – a disease that has left Mr. Fletcher tethered to an oxygen tank 24 hours a day.

"We didn't carry M-16s on the front lines, but we helped keep the country free," the 46-year-old says, pulling back on the highway, his portable oxygen tank hissing in the backseat.

"Now the way we're treated is like the Vietnam vets coming home and being spit on. They've just turned their backs on us."

More than 100 current and former workers at U.S. government sites such as Rocky Flats have been diagnosed with beryllium disease in recent years – and dozens more are expected.

Many are machinists who, under the strictest security, sawed, welded, and cut the dangerous metal for use in America's nuclear arsenal.

Now, some say that the country they loyally served for years has betrayed them.

"I thought, 'This was the government. They weren't going to put our lives in danger,' " says Glenn Bell, who contracted the disease at a weapons plant in Tennessee.

Some victims have sued the government for negligence. Others want a federal compensation fund. Others just want assurances more workers won't get sick.

The U.S. Energy Department, which historically has been responsible for nuclear weapons production, says it is taking action: It plans to spend $130 million over the next 10 years for improved air sampling, training, and medical monitoring.

> **'This is an especially unfortunate situation we have. These people were told repeatedly that these were safe work places...'**
>
> *Paul Wambach*
> Energy Department industrial hygienist

"There's clearly something amiss that needs to be corrected," says Dr. Paul Seligman, the Energy Department's health studies director.

In all, 115 current and former workers at Energy Department sites have been diagnosed with the disease. Another 236 have abnormal blood tests – a sign they may very well develop the illness.

Virtually all of these cases have occurred at the Rocky Flats plant, which is being torn down, and the famed Y-12 nuclear weapons plant in Oak Ridge, Tenn.

Energy Department officials acknowledge that workers at these sites clearly were told conditions were safe.

And for years, they appeared to be: Beryllium air counts were typically below the safety limit, and no one was getting sick.

But in reality, air monitoring was so poor that no one knew how much dust individual workers were being exposed to, government records show.

So when workers started coming down with the disease in the mid-1980s, officials were hard-pressed to explain what had gone wrong.

"This is an especially unfortunate situation we have," says Paul Wambach, an Energy Department industrial hygienist. "These people were told repeatedly that these were safe work places, there were controls put in place, there was monitoring going on.

"So being told you have a chronic, progressive disease that you are going to have to deal with the rest of your life is not good news.

"There's no good spin to put on it," he says. "I'd be upset, too."

The number of cases is expected to grow: Workers continue to be checked for the disease, and exposure to beryllium dust remains possible at 10 Energy Department plants and laboratories. These sites are owned by the government but managed by private contractors, and so the workers are not federal employees.

At Rocky Flats, victims meet once a month to talk about their illness. On one such day, six file into a local restaurant.

"Smoking or nonsmoking?" the waitress asks.

"Nonsmoking," Mr. Fletcher says.

"Oh," she says, noticing three men toting oxygen tanks. "Of course."

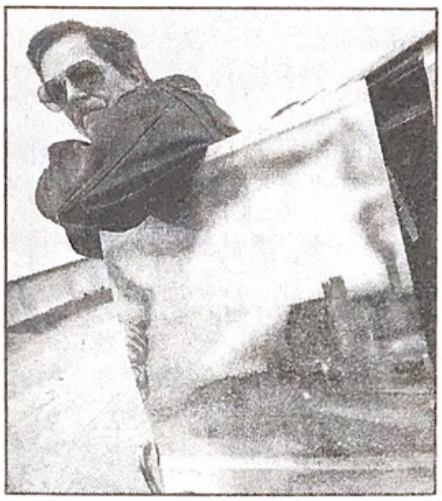
They file to the back, drawing stares as they go.

"I'm aware of it," Mr. Fletcher says. "I'm aware of it every day. I've had people say, 'Cigarette smoking caught up with you, huh?' And I've never smoked a day in my life."

They sit around a long table and, in rapid succession, say the government deceived them.

"They used us as guinea pigs," one says.

"I wouldn't wish this on my worst enemy, what they did to me," another says.



Glenn Bell works at a bomb plant in Oak Ridge, Tenn., where he contracted beryllium disease. He painted the side of his van with a scene of smoke coming out of the plant. His personalized license plate states: 'WHEEZIN.'

"This was all needless," Mr. Fletcher says, with the intensity of a high school football coach. "They could have achieved their goals, defended this country, without sacrificing people's health."

At the end of the table is Willie Hobbs, a 64-year-old who has been on oxygen for six years. Medicine has helped his breathing, but he complains of the side effects: cataracts, bone loss, and mood swings.

Ron Roerish, a 57-year-old who still works at Rocky Flats, mentions how the disease has robbed many of the victims of their masculinity. For him, sex has become difficult, if not impossible. And he used to hunt elk in the Rockies and fish in the high lakes. Now he can barely tag along as the camp cook.

"They say you can live a full life, but what's that? I don't think I'm living a normal life."

There are similar sentiments in Oak Ridge, Tenn., where beryllium is handled at the Y-12 nuclear weapons plant.

For years, the city of Oak Ridge was so secret it didn't even appear on maps. The government built the entire town – homes, schools, stores included – during World War II with one goal in mind: create a nuclear bomb before the Germans did. Three massive, mysterious plants were constructed at Oak Ridge: X-10, K-25, and Y-12.

Today, the Y-12 plant stretches for two miles in Bear Creek Valley. It is managed by Lockheed Martin Energy Systems and consists of dozens of drab, rectangular buildings. Plumes of steam can be seen here and there, and security checkpoints are at every gate.

Since 1991, records show, 28 current and former Y-12 workers have developed beryllium disease.

Among them: Glenn Bell, a 51-year-old with a reddish face and large glasses.

He started there in 1968, when an arm injury kept him out of the Vietnam War. "This was my way of serving my country without going into the service," he says. "What we were doing was going to save the world – be a deterrent to communism."

But now he has beryllium disease, is divorced, and lives alone in a cluttered house with three pet ferrets.

He has no visible symptoms, but he says he has been hospitalized several times for breathing problems. Steroids help, he says, but they make him moody and depressed.

"There are some days I want to sling the ferrets out the back door."

One outlet is his research. He says he spends two hours a day tracking down government documents about beryllium, e-mailing other victims, and writing letters to local newspapers. Forty binders of records now line his living room shelves, and two filing cabinets are crammed with more.

"It's kind of like running a counter-intelligence agency," he says.

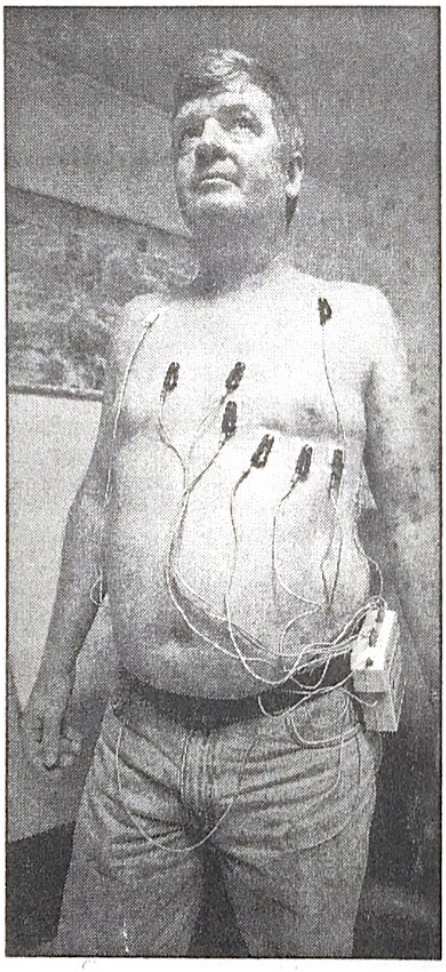
Perhaps nothing says more about Mr. Bell than what's in his driveway.

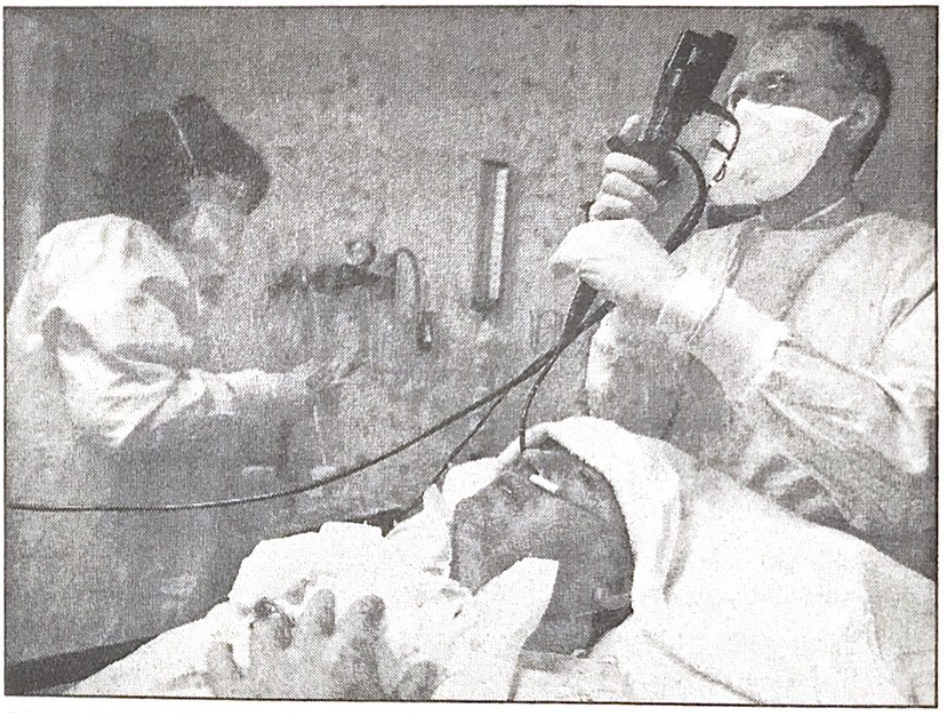
There, under a metal carport, is his 1969 Chevy van. An air-brush artist, Mr. Bell painted it a couple of summers ago, calling it "Toxic Burn."

One side depicts Oak Ridge of the future, a city floating amid the clouds. The other side depicts the bomb plant. Thick, black smoke rises from the plant and swirls around a nude woman who tries to capture it in a caldron, only to have it spill out and envelop a man behind her, his arms outstretched in agony.

"It's pretty much a statement," Mr. Bell says.

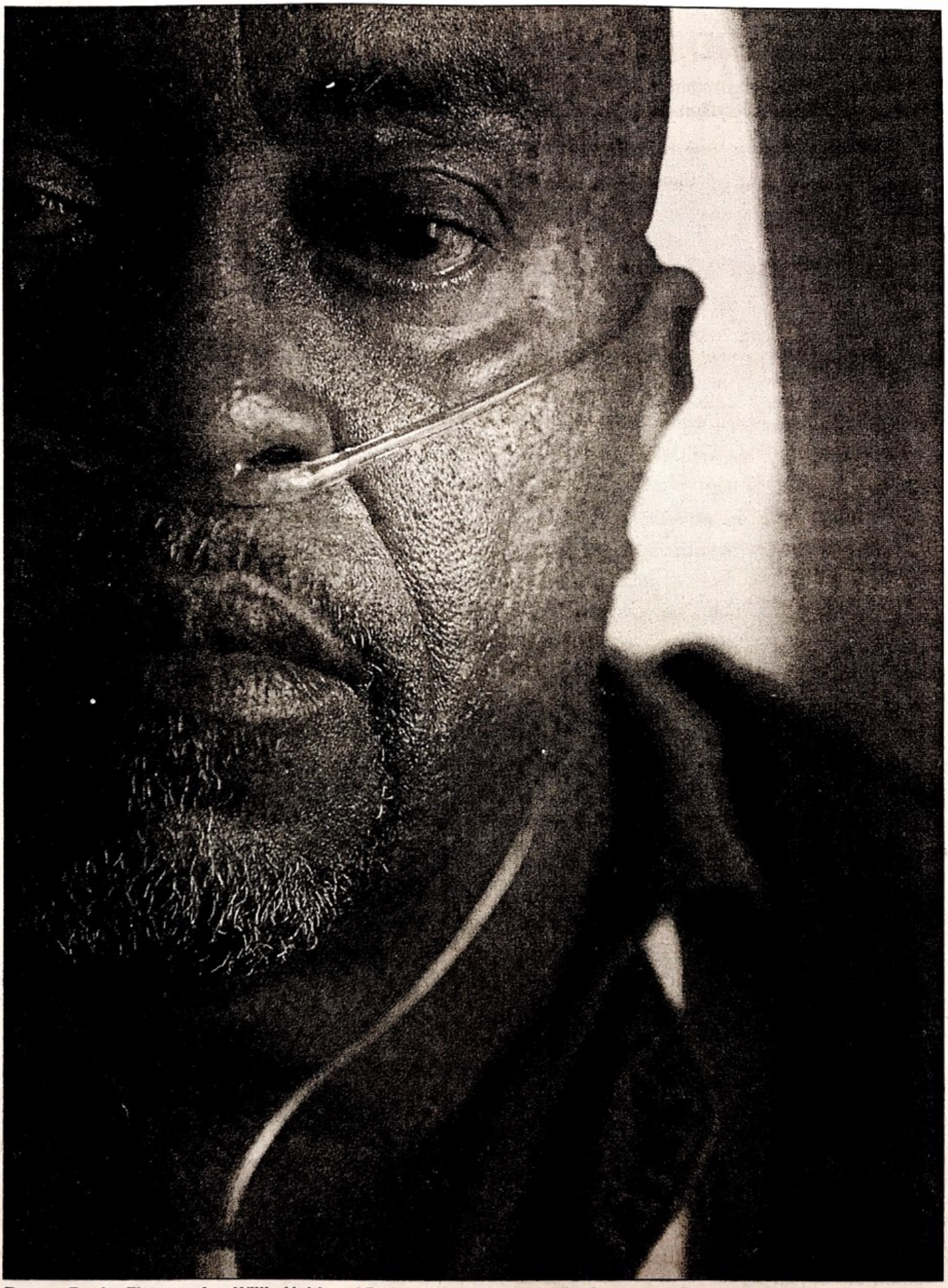
So is the personalized license plate: "WHEEZIN."





LEFT: Bill Fletcher undergoes a battery of tests at a Denver hospital. 'This was all needless,' Mr. Fletcher says of his illness.

ABOVE: Dr. Lee Newman (right) uses a fiber optic video camera to look into Mr. Fletcher's lungs. Mr. Fletcher, 46, contracted beryllium disease at the former Rocky Flats nuclear weapons plant.



Former Rocky Flats worker Willie Hobbs of Denver must carry a tank of oxygen wherever he goes.

DEADLY ALLIANCE

Day 1: Weapons over workers

You too may be at risk

BY SAM ROE
BLADE SENIOR WRITER

You don't have to be a beryllium worker to be at risk for beryllium disease.

If you've ever lived near a beryllium plant, you may be at risk. If you've ever toured a beryllium facility, you may be at risk.

And if you've ever bought a used car from a beryllium worker, you may be at risk.

These risks may be extremely low, but they do exist, health officials say.

Overall, beryllium disease is a rare illness, almost exclusively affecting workers in factories and metal shops that produce or machine the material. But anyone is at risk if they have ever been exposed to beryllium dust.

Handling a finished beryllium product is not risky – unless you cut, sand, or otherwise alter it, creating dust.

It is unknown how much beryllium dust a person must breathe in to contract this often-fatal lung illness or how long a person must be exposed. Some people have become sick with seemingly insignificant exposures.

But there is no known case of someone developing the disease after being exposed for only a few hours.

Nor is there a documented case of someone getting it from touring a beryllium factory or driving a car contaminated with dust from a worker's clothing.

Still, health officials say citizens should be aware of all potential risks. If not, people may develop the disease and never make the connection between their illnesses and beryllium.

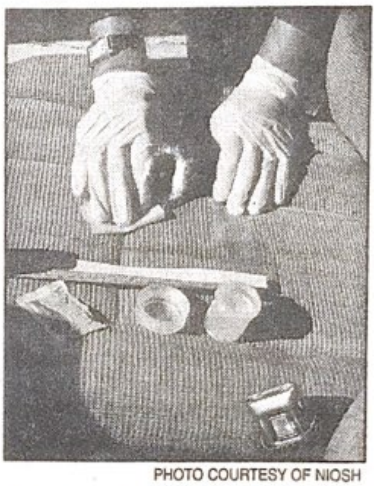


PHOTO COURTESY OF NIOSH

A researcher checks the seat of a car belonging to a worker at an Alabama machine shop. A study concluded that workers at the shop were contaminating their cars with beryllium dust.

"If somebody developed lung disease and had never worked in a setting in which they were likely to have been exposed to beryllium, it would be very unusual for a physician to pursue the question of whether they had beryllium disease," says Dr. Kathleen Kreiss, a beryllium researcher at the National Institute for Occupational Safety and Health.

And early detection is important because beryllium disease, though not curable, is treatable. Medication can extend the lives of victims for years.

Other than current and former beryllium workers, here are those who may be at risk:

CONTRACTORS

At least one contractor – an electrician from Tucson, Ariz. – has been diagnosed with beryllium disease after working in a beryllium plant.

George Faccio, 64, was in and out of the Brush Wellman Inc. plant in Tucson from 1983 to 1985. "His exposure to beryllium was really just walking around the plant, breathing the air," says his attorney, James Heckbert.

Mr. Faccio was diagnosed with the disease in 1994 after complaining of shortness of breath and fatigue, Mr. Heckbert says. The electrician is suing Brush Wellman, saying it did not warn him of the dangers.

Brush says it thoroughly warns contractors.

RESIDENTS

In the 1940s and 1950s, at least 41 residents living near beryllium plants in Ohio and Pennsylvania developed the disease through air pollution. Several victims died.

Citizens within five miles of the Reading, Pa., plant got the disease; residents within three-quarters of a mile of the Lorain, O., plant got sick.

There have been no documented air pollution cases since the 1950s, and Brush Wellman says residents near its plants are not at risk.

But records from the Ohio Environmental Protection Agency show that the amount of beryllium dust near Brush's main plant outside Elmore, O., has been periodically over the U.S. safety limit.

No studies have been done to determine whether residents in this rural area have been affected. Brush says it knows of no such complaints.

PEOPLE TAKING TOURS

Some health officials advise against taking tours of beryllium plants.

But Brush continues to give tours of its Elmore plant. Among those who have taken them: spouses of beryllium workers, Toledo congresswoman Marcy Kaptur, and news reporters.

When Brush held an open house last October, several members of the environmental group Ohio Citizen Action protested in front of the plant. "We're not convinced the inside of that plant is safe," says Sarah Ogdahl, the group's Toledo director.

Brush officials say it is highly unlikely anyone has been harmed by the tours. Operations are shut during the tours, and high-risk areas are off-limits.

But Brush acknowledges there is a risk of exposure. When asked whether someone could get beryllium disease by touring its plant, Brush administrator Marc Kolanz says: "We can only tell you what we know: In past history, we don't know of any cases that have originated from a tour at the plant."

RELATIVES

About two dozen people have contracted the disease from dust carried into their homes by beryllium workers.

Many victims have been women who shook out and washed their husbands' contaminated clothing.

These illnesses were discovered in the 1940s and 1950s, when beryllium plants did not have many of today's safeguards, such as showers and a change of clothes.

Since then, there has been only one known case of a person contracting beryllium disease outside the workplace. Carol Mason, a 64-year-old from Wood County, was diagnosed with the disease in 1990.

Her husband worked at the Elmore plant, but her exposure to beryllium was limited: She handled his work clothes twice, took two tours of the plant, and spent a week brushing metallic flakes from her husband's face and scalp after a work accident.

In 1997, a government study found that workers at an Alabama machine shop were leaving work with beryllium dust on their hands and clothes, spreading it to their cars and, presumably, their homes.

The workers' relatives have not been tested for early indications of the disease. If they were, a few cases might be found, says the study's author, Wayne Sanderson of the National Institute for Occupational Safety and Health.

ACQUAINTANCES

Mr. Sanderson says if you buy a used car from a beryllium worker, you should have it cleaned inside before you drive it. That's because his study found that workers at the Alabama machine shop were tracking beryllium dust into their cars.

"There were some workers that were significantly contaminating their vehicles," he says.

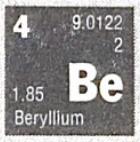
But the health risk "is probably not tremendous," he says, and there have been no illnesses reported from such exposures.

And Mr. Sanderson says that although workers were found to have beryllium dust on them, it is not dangerous to shake hands with them or sit next to them on the bus. "It's really highly unlikely that the short-term exposure you would get in those sort of situations would lead to chronic beryllium disease."

A LOOK AT THE SERIES:

'Deadly Alliance' is based on a 22-month investigation by The Blade. Thousands of court, industry, and recently declassified U.S. government documents were reviewed, and dozens of government officials, industry leaders, and victims were interviewed.

About beryllium: Beryllium is a hard, lightweight, gray metallic element. It does not occur in nature as a pure metal; it is extracted from minerals, chiefly bertrandite and beryl, and produced through a series of chemical processes. Beryllium is used in nuclear weapons, missiles, and jet fighters. Small amounts are added to other metals, such as copper, and used in computer connectors, household appliances, and car ignitions. Beryllium's atomic number is 4 and chemical symbol Be.



About the disease: People exposed to beryllium dust often develop a lung illness called chronic beryllium disease, also known as berylliosis. It is caused by the dust lodging deep in the lungs. Symptoms include coughing and shortness of breath, which may not appear until many years after the last exposure to beryllium. The disease is often fatal, and there is no cure. Scientists believe some people have a genetic predisposition to the disease. The federal exposure limit for workers is 2 micrograms of beryllium dust per cubic meter of air– equivalent to the amount of dust the size of a pencil tip spread throughout a 6-foot-high box the size of a football field.

About the victims: Researchers estimate 1,200 Americans have contracted beryllium disease, and hundreds have died, making it the No. 1 illness directly caused by America's Cold War buildup. Many cases have occurred in Ohio, Pennsylvania, Arizona, Colorado, and Tennessee, home of beryllium or nuclear weapons plants. Fifty current or former workers at the Elmore plant have the disease. Twenty-six others have an abnormal blood test – a sign they may very well develop the illness.

To comment

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