Chicago Tribune
Breaking News, Since 1847

WATCHDOG

PART ONE OF FOUR

Fear fans flames for chemical makers

Manufacturers of fire retardants rely on questionable testimony, front groups to push standards that boost demand for their toxic — and ineffective — products

By **Patricia Callahan** and **Sam Roe**, Chicago Tribune reporters

May 6, 2012

Dr. David Heimbach knows how to tell a story.

Before California lawmakers last year, the noted burn surgeon drew gasps from the crowd as he described a 7-week-old baby girl who was burned in a fire started by a candle while she lay on a pillow that lacked flame retardant chemicals.

"Now this is a tiny little person, no bigger than my Italian greyhound at home," said Heimbach, gesturing to approximate the baby's size. "Half of her body was severely burned. She ultimately died after about three weeks of pain and misery in the hospital."

Heimbach's passionate testimony about the baby's death made the long-term health concerns about flame retardants voiced by doctors, environmentalists and even firefighters sound abstract and petty.

But there was a problem with his testimony: It wasn't true.

Records show there was no dangerous pillow or candle fire. The baby he described didn't exist.

Neither did the 9-week-old patient who Heimbach told California legislators died in a candle fire in 2009. Nor did the 6-week-old patient who he told Alaska lawmakers was fatally burned in her crib in 2010.

Heimbach is not just a prominent burn doctor. He is a star witness for the manufacturers of flame retardants.

His testimony, the Tribune found, is part of a decades-long campaign of deception that has loaded the furniture and electronics in American homes with pounds of toxic chemicals linked to **cancer**, neurological deficits, developmental problems and impaired fertility.

The tactics started with Big Tobacco, which wanted to shift focus away from cigarettes as the cause of fire deaths, and continued as chemical companies worked to preserve a lucrative market for their products, according to a Tribune review of thousands of government, scientific

and internal industry documents.

These powerful industries distorted science in ways that overstated the benefits of the chemicals, created a phony consumer watchdog group that stoked the public's fear of fire and helped organize and steer an association of top fire officials that spent more than a decade campaigning for their cause.

Today, scientists know that some flame retardants escape from household products and settle in dust. That's why toddlers, who play on the floor and put things in their mouths, generally have far higher levels of these chemicals in their bodies than their parents.

Blood levels of certain widely used flame retardants doubled in adults every two to five years between 1970 and 2004. More recent studies show levels haven't declined in the U.S. even though some of the chemicals have been pulled from the market. A typical American baby is born with the highest recorded concentrations of flame retardants among infants in the world.

People might be willing to accept the health risks if the flame retardants packed into sofas and easy chairs worked as promised. But they don't.

The chemical industry often points to a government study from the 1980s as proof that flame retardants save lives. But the study's lead author, Vytenis Babrauskas, said in an interview that the industry has grossly distorted his findings and that the amount of retardants used in household furniture doesn't work.

"The fire just laughs at it," he said.

Other government scientists subsequently found that the flame retardants in household furniture don't protect consumers from fire in any meaningful way.

The **U.S. Environmental Protection Agency**, meanwhile, has allowed generation after generation of flame retardants onto the market and into American homes without thoroughly assessing the health risks. The EPA even promoted one chemical mixture as a safe, eco-friendly flame retardant despite grave concerns from its own scientists about potential hazards to humans and wildlife.

Since the 1970s manufacturers have repeatedly withdrawn flame retardants amid health concerns. Some have been banned by a **United Nations** treaty that seeks to eliminate the worst chemicals in the world.

Chemtura Corp. and **Albemarle Corp.**, the two biggest U.S. manufacturers of flame retardants, say their products are safe and effective, arguing that they have been extensively evaluated by government agencies here and in **Europe**.

"Flame retardants provide an essential tool to enable manufacturers of products to meet the fire safety codes and standards necessary to protect life and property in a modern world," John Gustavsen, a Chemtura spokesman, said in a written statement.

His company, Gustavsen said, strongly disagrees with the main findings of the Tribune's

investigation.

Heimbach, the burn doctor, has regularly supported the industry's position that flame retardants save lives. But he now acknowledges the stories he told lawmakers about victims were not always factual.

He told the Tribune his testimony in California was "an anecdotal story rather than anything which I would say was absolutely true under oath, because I wasn't under oath."

Heimbach, a retired Seattle doctor and former president of the American Burn Association, also said his anecdotes were not about different children but about the same infant. But records and interviews show that the baby Heimbach said he had in mind when testifying didn't die as he described and that flame retardants were not a factor.

After the Tribune confronted chemical executives with Heimbach's questionable testimony, he offered, through his lawyer, another explanation for why his stories didn't add up: He intentionally changed the facts to protect patient privacy.

Yet the most crucial parts of his testimony — the cause of the fire and the lack of flame retardants — had nothing to do with privacy. Instead, they served to bolster the industry's argument that chemical retardants save lives.

In the last quarter-century, worldwide demand for flame retardants has skyrocketed to 3.4 billion pounds in 2009 from 526 million pounds in 1983, according to market research from The Freedonia Group, which projects demand will reach 4.4 billion pounds by 2014.

As evidence of the health risks associated with these chemicals piled up, the industry mounted a misleading campaign to fuel demand.

There is no better example of these deceptive tactics than the Citizens for Fire Safety Institute, the industry front group that sponsored Heimbach and his vivid testimony about burned babies.

FEAR AND DECEPTION

In the website photo, five grinning children stand in front of a red brick fire station that could be on any corner in America. They hold a hand-drawn banner that says "fire safety" with a heart dotting the letter "i."

Citizens for Fire Safety describes itself as a group of people with altruistic intentions: "a coalition of fire professionals, educators, community activists, burn centers, doctors, fire departments and industry leaders, united to ensure that our country is protected by the highest standards of fire safety."

Heimbach summoned that image when he told lawmakers that the organization was "made up of many people like me who have no particular interest in the chemical companies: numerous fire departments, numerous firefighters and many, many burn docs."

But public records demonstrate that Citizens for Fire Safety actually is a trade association for chemical companies. Its executive director, Grant Gillham, honed his political skills advising tobacco executives. And the group's efforts to influence fire-safety policies are guided by a mission to "promote common business interests of members involved with the chemical manufacturing industry," tax records show.

Its only sources of funding — about $17 million between 2008 and 2010 — are "membership dues and assessments" and the interest that money earns.

The group has only three members: Albemarle, ICL Industrial Products and Chemtura, according to records the organization filed with California lobbying regulators. Those three companies are the largest manufacturers of flame retardants and together control 40 percent of the world market for these chemicals, according to The Freedonia Group, a Cleveland-based research firm.

Citizens for Fire Safety has spent its money primarily on lobbying and political expenses, tax records show. Since federal law makes it nearly impossible for the EPA to ban toxic chemicals and Congress rarely steps in, state legislatures from Alaska to Vermont have become the sites of intense battles over flame retardants.

Many of the witnesses supporting flame retardants at these hearings were either paid directly by Citizens for Fire Safety or were members of groups that benefited financially from Citizens for Fire Safety's donations, according to tax documents and other records.

At the same time, Citizens for Fire Safety has portrayed its opposition as misguided, wealthy environmentalists. But its opponents include a diverse group of public health advocates as well as firefighters who are alarmed by studies showing some flame retardants can make smoke from fires even more toxic.

Matt Vinci, president of the Professional Fire Fighters of Vermont, faced what he called "dirty tactics" when he successfully lobbied for his state to ban one flame retardant chemical in 2009.

Particularly offensive to Vinci were letters Citizens for Fire Safety sent to Vermont fire chiefs saying the ban would "present an additional hazard for those of us in the fire safety profession." But the letter's author wasn't a firefighter; he was a California public relations consultant.

"Citizens for Fire Safety did everything they could to portray themselves as firefighters, as Vermont citizens for fire safety, when it really wasn't Vermont citizens for fire safety at all," Vinci said.

The group also has misrepresented itself in other ways. On its website, Citizens for Fire Safety said it had joined with the international firefighters' association, the American Burn Association and a key federal agency "to conduct ongoing studies to ensure safe and effective fire prevention."

Both of those organizations and the federal agency, however, said that simply is not true.

"They are lying," said Jeff Zack, a spokesman for the **International Association of Fire**

Fighters. "They aren't working with us on anything."

After inquiries from the Tribune, Citizens for Fire Safety deleted that passage from its website.

Gillham, the executive director, declined to comment. Albemarle, Chemtura and ICL Industrial Products also declined to answer specific questions about the group.

Albemarle Chief Sustainability Officer David Clary did say that his company has been transparent about its funding of Citizens for Fire Safety.

"We believe that this support for advocacy groups is critical to raise awareness of the importance of fire safety and give a voice to those who want to speak out on this important public issue," Clary said in a written statement.

Citizens for Fire Safety is the latest in a string of industry groups that have sprung up on different continents in the last 15 years — casting doubt on health concerns, shooting down restrictions and working to expand the market for flame retardants in furniture and electronics.

For example, the Bromine Science and Environmental Forum, based in Brussels, may sound like a neutral scientific body. But it was founded and funded by four chemical manufacturers, including Albemarle, to influence the debate about flame retardants made with bromine.

Albemarle's global director of product advocacy, Raymond Dawson, said in blunt testimony before Washington state lawmakers in 2007 that the forum is "a group dedicated to generating science in support of brominated flame retardants."

An official from **Burson-Marsteller**, the global public relations firm that helps run the organization, said the bromine group is not misleading anyone because regulators, scientists and other stakeholders are well-aware it represents industry.

The PR firm also helps run the Alliance for Consumer Fire Safety in Europe, which is funded by a trade association of flame retardant manufacturers. The alliance's director, **Bob Graham**, said the group's aim is to improve fire-safety standards for upholstered furniture sold in Europe.

The group's website taps into the public's fear of fire, touting an "interactive burn test tool" that allows visitors to choose a European country and watch a sofa from that nation being torched.

Next to a photo of an easy chair fully engulfed in flames, four words stand out in large capital letters: "ARE YOU SITTING COMFORTABLY?"

'IMAGINE A CHILD CRYING'

The amount of flame retardants in a typical American home isn't measured in parts per billion or parts per million. It's measured in ounces and pounds.

A large couch can have up to 2 pounds in its foam cushions. The chemicals also are inside some highchairs, diaper-changing pads and **breast-feeding** pillows. Recyclers turn chemically

treated foam into the padding underneath carpets.

"When we're eating organic, we're avoiding very small amounts of pesticides," said Arlene Blum, a California chemist who has fought to limit flame retardants in household products. "Then we sit on our couch that can contain a pound of chemicals that's from the same family as banned pesticides like DDT."

These chemicals are ubiquitous not because federal rules demand it. In fact, scientists at the U.S. Consumer Product Safety Commission have determined that the flame retardants in household furniture aren't effective, and some pose unnecessary health risks.

The chemicals are widely used because of an obscure rule adopted by California regulators in 1975. Back then, a state chemist devised an easy-to-replicate burn test that didn't require manufacturers to set furniture on fire, an expensive proposition.

The test calls for exposing raw foam to a candle-like flame for 12 seconds. The cheapest way to pass the test is to add flame retardants to the foam inside cushions.

But couches aren't made of foam alone. In a real fire, the upholstery fabric, typically not treated with flame retardants, burns first, and the flames grow big enough that they overwhelm even fire-retardant foam, scientists at two federal agencies have found.

Nevertheless, in the decades since that rule went into effect, lawyers have regularly argued that their burn-victim clients would have been spared if only their sofas had been made with California foam. Faced with the specter of these lawsuits — and the logistical challenge of producing separate products just for California — many manufacturers began using flame retardant foam across their product lines.

As a result, California has become the most critical battleground in recent years for advocates trying to reduce the prevalence of these chemicals in American homes.

Citizens for Fire Safety has successfully fought back with a powerful, and surprising, tactic: making flame retardants a racial issue.

The group and witnesses with ties to it have argued that impoverished, minority children would burn to death if flame retardants were removed from household products.

In 2009, for instance, members of the **California State Assembly** were considering a bill that would have made it unnecessary to add flame retardants to many baby products by excluding them from the state's flammability regulation.

Up to the microphone stepped Zyra McCloud, an African-American community activist from Inglewood, Calif.

McCloud was president of a community group that listed Citizens for Fire Safety as a sponsor on its website and included photos of McCloud with Gillham, the executive director. She did not disclose this connection to the assembly, nor was she asked.

In a news release, Citizens for Fire Safety already had quoted McCloud saying that minority children, who constitute a disproportionate share of fire deaths, would bear the brunt of the "ill-conceived and unsafe legislation."

At the hearing, the committee chairwoman told both sides they were out of time for testimony, but McCloud pleaded with her to allow two elementary school students from her district to address lawmakers.

"We have spent all weekend long with the kids that have had family members and friends who have died in fires, and we are praying and appealing to you that you would at least allow the two boys to speak," she said.

One of the boys, a 10-year-old, read from a statement.

"I just want you to imagine a child crying for help in a burning building, dying, when there was a person who only had to vote to save their life," he said.

Citizens for Fire Safety prevailed. The bill later went down to defeat.

McCloud told the Tribune, "I've always been a person that's fought against things that would hurt children." She then asked for questions in writing but never answered them.

Nearly two years after that bill failed, one of the nation's top burn surgeons would also invoke the image of a dead child before California lawmakers on behalf of Citizens for Fire Safety.

'THIS IS HORRIBLE'

When Dr. David Heimbach walked into the California Senate committee hearing last year, the stakes had never been higher for flame retardant manufacturers.

Once again, senators were considering an overhaul of the state's flammability regulation — one that advocates believed would dramatically reduce the amount of flame retardants in American homes.

The bill would allow manufacturers to choose the existing candle-like flame test or a new one based on a smoldering cigarette, a far more common source of fires than candles. Manufacturers could pass the new test by using resistant fabrics rather than adding toxic chemicals to the foam inside.

To maintain the status quo — and avoid a hit to the bottom line — chemical makers needed to stress that fires started by candles were a serious threat.

Heimbach, Citizens for Fire Safety's star witness, did just that.

With Citizens for Fire Safety's Gillham watching from the audience, Heimbach not only passionately described the fatal burns a 7-week-old Alaska patient received lying on a pillow that lacked flame retardants, he also blamed the 2010 blaze on a candle.

In fact, he specifically said the baby's mother had placed a candle in the girl's crib.

Heimbach had told similar stories before, the Tribune found. In 2009, he told a California State Assembly committee that he had treated a 9-week-old girl who died that spring after a candle beside her crib turned over. "We had to split open her fingers because they were so charred," he testified.

In 2010, he told Alaska lawmakers about a 6-week-old girl from Washington state who died that year after a dog knocked a candle onto her crib, which did not have a flame retardant mattress.

Heimbach's hospital in Seattle, Harborview Medical Center, declined to help the Tribune confirm his accounts. But records from the King County medical examiner's office show that no child matching Heimbach's descriptions has died in his hospital in the last 16 years.

The only infant who came close in terms of age and date of death was Nancy Garcia-Diaz, a 6-week-old who died in 2009 after a house fire in rural Washington.

In an interview, Heimbach said his anecdotes were all about the same baby — one who died at his hospital, though he didn't know the child's name. Contrary to his testimony, he said he had not taken care of the patient.

Told about Nancy, Heimbach said she was probably the baby he had in mind and emailed a Tribune reporter two photographs of a severely burned child, images that he said he had used in a presentation at a medical conference. Medical records and Nancy's mother confirmed those pictures were indeed of Nancy.

But Nancy didn't die in a fire caused by a candle, as Heimbach has repeatedly testified. Fire records obtained by the Tribune show the blaze was caused by an overloaded, overheated extension cord.

"There were no candles, no pets — just the misuse of extension cords," said Mike Makela, an investigator for the Snohomish County fire marshal's office.

In his testimony last year, Heimbach stated the baby was in a crib on a fire-retardant mattress and on a non-retardant pillow. The upper half of her body was burned, he said.

But public records show there was no crib — she was resting on a bed — and no pillow. And, Makela said, flame retardants played no role in the pattern of her burns.

Fire authorities, Heimbach said, "may know more about it than I do, but that was the information that I had."

Heimbach said he couldn't recall who gave him that information but that Citizens for Fire Safety did not help craft his statements. He said the group has paid for his travel to testify and for some of his time, though he would not give a dollar amount.

The details of his statements, he said, weren't as important as the principle. "The principle is

that fire retardants will retard fires and will prevent burns," he said.

Later, Heimbach said through his attorney that federal rules prohibit him from disclosing information that would identify a patient. He said that when describing particular burn cases, he follows standard protocol under the rules by "de-identifying" patients — that is, changing or omitting identifying information to protect their privacy.

But in testimony at state hearings, Heimbach not only changed facts, he added new ones, such as candles starting deadly blazes and the lack of flame retardants — details that aided the chemical industry's position.

Nancy's mother, who asked that her name not be used, said she never granted Heimbach permission to use her daughter's photograph.

"Nancy's memory is sacred to us," she said. "My daughter deserves respect. She lived such a short time and she suffered a lot. This is horrible."

Heimbach was head of Harborview's burn center for 25 years; he also was a professor of surgery at the **University of Washington** until his retirement last year. He estimated he might have saved "hundreds if not thousands" of lives. In 2009, the **Dalai Lama** presented Heimbach an award for his pioneering care of burn victims around the world.

"I'm a well-meaning guy," Heimbach said. "I'm not in the pocket of industry."

When Heimbach testified last spring in California on the bill that could have significantly reduced the use of flame retardants, he didn't tell lawmakers he was altering facts about the burn victim. Only when asked by a senator did he reveal that Citizens for Fire Safety paid for his trip there.

When it came time to vote, the senators overwhelmingly sided with Heimbach and Citizens for Fire Safety, sticking with the furniture standard based on a candle-like flame.

Public health advocates had one last hope: Senators had seven days in which they could change their votes. As the advocates tried to persuade senators to reconsider, Citizens for Fire Safety put out a news alert that linked to a video called "Killer Couches!"

To the sounds of sinister music and crackling flames, a sofa made without flame retardants became an inferno. Then these words appeared: "Are You Sitting Comfortably?"

No senators changed their votes, and the bill was dead. The chemical companies had won again.

*Tribune reporter **Michael Hawthorne** contributed to this report.*

pcallahan@tribune.com

sroe@tribune.com

"I'm a well-meaning guy. I'm not in the pocket of industry."

— Dr. David Heimbach, a burn expert. Above, Heimbach testifies in 2011 against a California state Senate bill that could have reduced the use of flame retardant chemicals in furniture. Citizens for Fire Safety has paid for his travel to testify and for some of his time, he said later. (Robert Durell, For the Tribune / April 25, 2011)

Chicago Tribune
Breaking News, Since 1847

WATCHDOG

PART TWO OF FOUR

May 8, 2012

Big Tobacco wins fire marshals as allies in flame retardant push

Cigarette-makers had man on the inside of key fire-safety group

By **Patricia Callahan** and **Sam Roe**, Chicago Tribune reporters

The problem facing cigarette manufacturers decades ago involved tragic deaths and bad publicity, but it had nothing to do with cancer. It had to do with house fires.

Smoldering cigarettes were sparking fires and killing people. And tobacco executives didn't care for one obvious solution: create a "fire-safe" cigarette, one less likely to start a blaze.

The industry insisted it couldn't make a fire-safe cigarette that would still appeal to smokers and instead promoted flame retardant furniture — shifting attention to the couches and chairs that were going up in flames.

But executives realized they lacked credibility, especially when burn victims and firefighters were pushing for changes to cigarettes.

So Big Tobacco launched an aggressive and cunning campaign to "neutralize" firefighting organizations and persuade these far more trusted groups to adopt tobacco's cause as their own. The industry poured millions of dollars into the effort, doling out grants to fire groups and hiring consultants to court them.

These strategic investments endeared cigarette executives to groups they called their "fire service friends."

"To give us clout, to give us power, to give us credibility, to give us leverage, to give us access where we don't ordinarily have access ourselves — those are the kinds of things that we're looking for," a Philip Morris executive told his peers in a 1984 training session on this strategy.

The tobacco industry's biggest prize? The National Association of State Fire Marshals, which represented the No. 1 fire officials in each state.

A former tobacco executive, Peter Sparber, helped organize the group, then steered its national agenda. He shaped its requests for federal rules requiring flame retardant furniture and fed the marshals tobacco's arguments for why altering furniture was a more effective way to prevent fires than altering cigarettes.

For years, the tobacco industry paid Sparber for what the marshals mistakenly thought was volunteer work.

The Tribune discovered details about Big Tobacco's secretive campaign buried among the 13 million documents cigarette executives made public after settling lawsuits that recouped the cost of treating sick smokers. These internal memos, speeches and strategic plans reveal the surprising and influential role of Big Tobacco in the buildup of toxic chemicals in American furniture.

This clever manipulation set the stage for a similar campaign of distortion and misdirection by the chemical industry that continues to this day.

Andrew McGuire, a burn survivor and MacArthur "genius grant" winner, said Sparber and the National Association of State Fire Marshals for years were his nemeses as he has pushed for fire-safe cigarettes, which would stop burning when not being smoked. McGuire came up against them again when he battled for reductions in the amount of flame retardant chemicals in Americans' homes.

"He played them like a Stradivarius," McGuire said of Sparber's relationship with the fire marshals.

A founding member of the fire marshals group disputes that they were unduly influenced, but he said he regrets that the organization accepted tobacco's money.

"There is no way you can explain to the public that taking money from the tobacco industry is a good thing," said Tom Brace, who served as a marshal in Minnesota and Washington state. "And had I to do that over again, I would not do that."

Brace and the fire marshals group often were at odds with colleagues in the firefighting community who worked to scale back the use of certain flame retardants after studies showed they can make smoke more toxic.

The fire marshals organization continued promoting flame retardant products even after it was clear that the chemicals inside were escaping, settling in dust and winding up in the bodies of babies and adults worldwide.

The marshals continued even after flame retardants were linked to cancer, neurological deficits, developmental problems and impaired fertility.

And they continued even after government scientists showed that flame retardants in household furniture were not protecting Americans from fire in any meaningful way.

Wooing the marshals

With the top executives of the largest U.S. cigarette companies gathered in a New York ballroom, Charles Powers rose to report that their trade group's multimillion-dollar investment in the firefighting community was paying off nicely.

It was October 1989, and the CEOs behind Marlboro, Camel and other major brands were in a closed-door meeting of the executive committee of the Tobacco Institute, the trade group that fought legislation that could hurt their business.

Powers noted that many fire officials who once were hostile were endorsing industry positions in key federal and state legislative battles over fire-safe cigarettes. The strategy by the Tobacco Institute of winning over these officials, including some state fire marshals, with grants and schmoozing was working.

"Though our assistance is 'no strings attached' for everyone, it is no accident that the fire service officials most interested in our educational materials are also the fire service leaders whom we have approached for endorsements," said Powers, a top executive at the Tobacco Institute.

He boasted: "Many of our former adversaries in the fire service defend us, support us and carry forth our federal legislation as their own."

Much of that success can be attributed to the fact that Big Tobacco had planted an inside man within the firefighting community.

A former Tobacco Institute vice president, Peter Sparber had spent years at the trade group doling out money to firefighting groups. He left to open his own lobbying and public affairs firm in the late 1980s but retained the Tobacco Institute as a major client.

This arm's-length relationship — working for Big Tobacco but having a business card that said "Sparber and Associates Inc." — allowed him to infiltrate an organization of public officials that became what the Tobacco Institute later called "the most politically potent group" in the firefighting community: the nation's state fire marshals.

These taxpayer-funded employees, typically appointed by governors, had a low profile nationally until Sparber came along. In 1989, Sparber helped organize the National Association of State Fire Marshals and volunteered to be the group's legislative consultant. The fire marshals put him on their executive board.

Sparber became so crucial to the fire marshals that they listed him on their association letterhead and for more than a decade shared a Washington office with him.

One of the marshals' first official acts was to endorse a tobacco-backed federal bill that called for yet another study of fire-safe cigarettes rather than a competing bill that would have quickly required cigarettes to change.

Like his tobacco industry patrons, Sparber worked to prevent a mandate for fire-safe cigarettes by shifting the focus to furniture.

For years, Sparber promoted an obscure California state rule on furniture flammability, one that manufacturers met by adding flame retardant chemicals to the foam in sofas and easy chairs.

California regulators had enacted the rule in 1975 out of frustration that too many residents were dying in fires caused by cigarettes. State and federal lawmakers had tried unsuccessfully since the 1920s to enact fire-safe cigarette requirements, so California regulators instead sought to fireproof the world around the cigarette.

With Sparber's help, the fire marshals in 1992 sought federal rules for flame retardant furniture, and Sparber went on to represent the marshals in years of meetings with the U.S. Consumer Product Safety Commission. His expense reports show that for several years he was billing the Tobacco

Institute $200 an hour for his work with the marshals, including time he spent on the marshals' petition for flame retardant furniture.

Sparber reported to the institute on the fire marshals' key activities and even passed along their internal documents. Tobacco Institute President Samuel Chilcote Jr., in turn, sent detailed memos to the CEOs of cigarette companies about the marshals' activities.

Chilcote declined to comment to the Tribune, saying he couldn't recall what happened so long ago.

Brace, a founder of the fire marshals group, said he knew Sparber was a former Tobacco Institute executive. But Brace said he didn't know in the association's early days that the institute was paying Sparber for his work with the marshals and didn't know that Sparber funneled so many of the marshals' internal documents to the cigarette industry.

Nevertheless, Brace said the marshals made their own decisions.

"The inference that the state fire marshals sitting around the table are easily led by this Svengali — there were arguments back and forth of what we should get involved in," Brace said in an interview. "We had some hot debates. But the characterization that Sparber led us out of the wilderness, I don't see it."

But records in tobacco executives' files show that Sparber helped set the fire marshals' agenda, suggesting who should speak at a key conference, which consultants they should retain and why they should oppose aggressive fire-safe cigarette requirements.

He also assisted the fire marshals with fundraising, nudging tobacco colleagues to contribute to the group.

Too close for comfort

Assisting Sparber was an old fan: Karen Deppa.

Deppa had solidified Sparber's reputation in the world of spin when, in a previous job as a journalist, she penned a glowing profile of Sparber for a magazine aimed at trade association executives. The story described him as a master of crisis management whom others could emulate, noting the deft way he had positioned smoking as a fundamental freedom and cast doubt on studies documenting the health hazards of smoking.

"I go home to my family every night, and not once have I felt uncomfortable about facing them over anything I've done at work," Sparber said in that article.

Within a year of the publication, the Tobacco Institute hired Deppa and made her the coordinator of its fire program. Records show she frequently signed off on Sparber's hourly billings for his work with the marshals.

Deppa ensured the Tobacco Institute pampered the marshals — faced with lean state budgets — with perks at the group's conferences, including bottles of wine, a hospitality suite and free mountain bike rentals, records show. She pressed the institute to fund a media-training seminar for the marshals, suggesting this would make them more confident speakers as they publicly discussed fire-safe cigarettes and other issues.

The fire marshals wound up using tobacco's talking points in the industry's protracted delay game.

When leaders of the marshals association addressed federal regulators, they would say they supported the concept of a national fire-safe cigarette requirement. But in the next breath, the marshals would nitpick the test methods federal scientists created to determine which cigarettes were less likely to cause fires.

Tobacco executives loathed those tests. Publicly, they argued that the tests failed to replicate "real world" conditions. Privately, they feared the tests would pave the way for laws that would force them to alter cigarettes — products that made them billions of dollars each year — in ways that their customers wouldn't like, records show. Some prototypes had an unpleasant taste or were difficult to smoke.

An internal R.J. Reynolds Tobacco Co. report noted that the lack of a standard test method had served to delay the adoption of fire-safe cigarette bills in 12 states.

The marshals' criticisms of the details of the tests were straight from Big Tobacco's playbook. This wasn't a coincidence. Questioned by a government scientist at a meeting of the federal panel crafting the tests, one marshal acknowledged that Sparber had briefed him on the issues, records show.

"They learned very quickly from their puppet masters how to craft the arguments to seem reasonable but cause delay," recalled McGuire, the burn survivor, who was a member of the panel and was at that meeting.

David Sutton, a spokesman for Philip Morris USA, rejected the notion that his company and the fire marshals worked together to delay fire-safe cigarette rules. For more than a decade, he said, the company worked hard to develop marketable cigarettes that were more likely to extinguish on their own.

Philip Morris collaborated with the marshals on flame retardant furniture standards in the early 1990s, he said, because the company believed those might present "a potentially more effective alternative for improved fire safety."

By 1993, records show, the fire marshals were so vehemently opposed to fire-safe cigarette test proposals — and so financially and philosophically connected to the cigarette industry — that a top Philip Morris lobbyist told the Tobacco Institute she feared that the marshals had actually become a liability. Records show she told colleagues she thought the National Association of State Fire Marshals was "tainted."

The lobbyist worried that "the relationship of the industry — especially Philip Morris — to the National Association of State Fire Marshals (NASFM) may eventually be disclosed publicly." She suggested to the Tobacco Institute that the fire marshals stop discussing fire-safe cigarettes and focus solely on furniture flammability standards.

But the industry didn't sever ties, in part because other cigarette executives thought they needed the marshals to counter fire-service groups that were pushing for fire-safe cigarette laws, records show.

A key prong in R.J. Reynolds' 1996 strategic plan to fight these laws was the marshals' petition to the Consumer Product Safety Commission for flame retardant furniture rules. A handwritten note on

the first page directs an R.J. Reynolds employee to file the plan under "Fire Safe Sparber."

The plan used italics to hammer home the urgency of focusing on the furniture fueling fires, not the cigarettes igniting them: "In 1996, fire officials must keep the pressure on the Commission to focus on the *fuels* rather than *ignition sources.*"

Playing 'hardball'

The fire marshals' actions helped Big Tobacco fend off fire-safe requirements for years. But the delays couldn't go on forever.

The Tobacco Institute shut down in 1999, a requirement of the multibillion-dollar court settlement between the industry and state attorneys general. Not long after that, states succeeded in passing rules requiring fire-safe cigarettes, so tobacco no longer had an incentive to promote flame retardant furniture.

But by then Sparber had found new clients with problems of their own: chemical manufacturers.

With each passing year, health concerns were growing as the most commonly used types of flame retardants were discovered in human breast milk and blood.

As Sparber worked to preserve and even expand the market for flame retardants, the fire marshals were again at his side. So was Deppa, whom he had hired from the Tobacco Institute.

So intertwined were Sparber, the chemical companies and the fire marshals that even Sparber couldn't always differentiate where the agendas diverged.

For instance, one of Sparber's clients as a lobbyist was the Bromine Science and Environmental Forum, an international trade group representing large manufacturers of flame retardants. Sparber revealed to federal regulators in 1999 that although the forum was paying his company's fees, the chemical group's goals for fire prevention were so aligned with those of the fire marshals association that he often lobbied for both groups on the same matters.

Chemtura Corp.,Albemarle Corp.and ICL Industrial Products — the three largest companies that fund the bromine forum — declined to answer questions about their relationships with Sparber or the fire marshals. Chemtura and Albemarle said their flame retardants are safe and effectively protect people and property from fires.

Brace, the former marshal, confirmed that his association became "heavily involved" with the flame retardant trade group and supported its agenda. He said he worked with the forum because of his desire to save lives, and he was leery of studies that linked the chemicals to health problems.

The bromine group, Brace said, paid for him to go to Japan, Korea and Taiwan, where he urged electronics manufacturers to add flame retardants to the plastic exteriors of computer monitors and televisions. The marshals later pushed for worldwide standards requiring that the plastic casings of electronics resist a candle flame and posted Internet videos comparing name-brand computer monitors that went up in flames with those that didn't.

John Dean, the fire marshals' president from 2006 to 2008, said that during his time the marshals were not being swayed by chemical companies and did not focus solely on flame retardants. "The

fire marshals were concerned about preventing fires, and we didn't really care how they did it," said Dean, a retired state fire marshal from Maine.

But the marshals did press for national furniture flammability rules that would have increased the use of flame retardant foam in the U.S., even though federal scientists had concluded that this type of chemically treated foam didn't provide any meaningful protection in fires.

To sway legislators and opponents, the marshals and Sparber characterized couches and easy chairs as dangers to society, sometimes referring to the foam inside cushions as "solid gasoline."

While Sparber was a registered lobbyist for Chemtura and its predecessor, Great Lakes Chemical Corp., the fire marshals asked federal regulators to require warning labels on furniture made with non-fire-retardant foam and sought a "hazardous material" designation for this type of foam.

In 2007, Sparber emailed executives at Chemtura and Albemarle about his efforts to get furniture stores declared "hazardous occupancies," a classification usually reserved for locations handling gasoline and other highly combustible materials.

Such a designation, Sparber wrote, "threatens to shut down any number of retailers," limit the number of sofas they could store or force them to install extensive sprinkler systems.

"Literally," he wrote, "a single sectional couch might exceed the limit."

The goal, Sparber wrote, was to make furniture manufacturers and retailers fear these "obviously draconian consequences" and thereby support strict flammability standards or face the wrath of code enforcement officials.

"This is hardball of the first order," Sparber wrote.

While these rules weren't adopted, the intimidating message hit a nerve with the industries Sparber threatened. Joseph Gerard, a retired furniture industry lobbyist, said he recalls Sparber sending him an inches-thick binder filled with copies of the same Associated Press story clipped from newspapers across the country. The story blamed the death of a South Carolina teenager on sofas that lacked flame retardants and quoted a fire marshal about the need for the chemicals.

Gerard said of Sparber: "His way of operating was so offensive, it just tore at me."

To the fire marshals, though, Sparber was a hero. The National Association of State Fire Marshals gave him its Hall of Fame award in 2008.

Sparber and Deppa declined to comment for this story.

Jim Narva, the fire marshals' current executive director, said Sparber has not represented the group for "a number of years" and that he took over Sparber's Washington office in 2008 or 2009.

"It's history," Narva said.

The marshals' policy statement on flame retardants, which hasn't been updated since 2008, says products that exist to fight fires should not be banned unless there is "significant evidence" that they cause harm or until other methods of fire protection are found to replace them.

Narva, who declined to answer detailed questions, said the fire marshals are not currently involved with flame retardant issues.

But the marshals' industry ties remain strong.

Deppa left Sparber and Associates in 2008 and, according to the marshals' website, became the group's "liaison to US government agencies and their staffs."

The marshals just last year helped defeat a crucial bill in California that would have reduced flame retardants in products nationwide. The association's president at the time wrote a letter opposing the legislation. A lobbyist for the Citizens for Fire Safety Institute, a front group for the largest makers of flame retardants, read excerpts of the letter at the hearing where the bill was voted down.

And who remains a financial sponsor of the fire marshals, with its logo on the group's home page?

Chemtura, one of the world's largest producers of flame retardants.

Tribune reporter ***Michael Hawthorne*** *contributed to this report.*

pcallahan@tribune.com

sroe@tribune.com

Chicago Tribune
Breaking News, Since 1847

WATCHDOG

PART THREE OF FOUR

May 9, 2012

Distorting science

Makers of flame retardants manipulate research findings to back their products, downplay health risks

By **Sam Roe** and **Patricia Callahan**, Chicago Tribune reporters

Twenty-five years ago, scientists gathered in a cramped government laboratory and set fire to specially designed chairs, TVs and electrical cables packed with flame retardants. For the next half-hour, they carefully measured how much the chemicals slowed the blaze.

It was one of the largest studies of its kind, and the chemical industry seized upon it, claiming the results showed that flame retardants gave people a 15-fold increase in time to escape fires.

Manufacturers of flame retardants would repeatedly point to this government study as key proof that these toxic chemicals — embedded in many common household items — prevented residential fires and saved lives.

But the study's lead author, Vytenis Babrauskas, told the Tribune that industry officials have "grossly distorted" the findings of his research, which was not based on real-world conditions. The small amounts of flame retardants in typical home furnishings, he said, offer little to no fire protection.

"Industry has used this study in ways that are improper and untruthful," he said.

The misuse of Babrauskas' work is but one example of how the chemical industry has manipulated scientific findings to promote the widespread use of flame retardants and downplay the health risks, a Tribune investigation shows. The industry has twisted research results, ignored findings that run counter to its aims and passed off biased, industry-funded reports as rigorous science.

As a result, the chemical industry successfully distorted the basic knowledge about toxic chemicals that are used in consumer products and linked to serious health problems, including cancer, developmental problems, neurological deficits and impaired fertility.

Industry has disseminated misleading research findings so frequently that they essentially have been adopted as fact. They have been cited by consultants, think tanks, regulators and Wikipedia, and have shaped the worldwide debate about the safety of flame retardants.

One series of studies financed by the chemical industry concluded that flame retardants prevent deadly fires, reduce pollutants and save society millions of dollars.

The main basis for these broad claims? A report so obscure it is available only in Swedish.

When the Tribune obtained a copy and translated it, the report revealed that many of industry's wide-ranging claims can be traced to information regarding just eight TV fires in western Stockholm more than 15 years ago.

Although industries often try to spin scientific findings on the safety and effectiveness of their products, the tactics employed by flame retardant manufacturers stand out.

Tom Muir, a Canadian government research analyst for 30 years, called the broad claims based on the eight Stockholm TV fires "the worst example I have ever seen of deliberate misinformation and distortion."

The American Chemistry Council, the leading trade group for the industry, said flame retardants are safe products that help protect life and property. "ACC's work is grounded in scientific evidence, as we believe regulatory decisions related to chemistry must be evaluated on a scientific basis," the trade group said in a written statement.

But when the Tribune asked the trade group to provide research that showed flame retardants are effective, the council initially provided only one study — the one Babrauskas wrote and now says is being distorted by industry.

Later, in response to additional questions from the newspaper, the trade group highlighted a different study as evidence that flame retardants work well: research based largely on the obscure Swedish report.

In reviewing key scientific studies and analyses behind the chemical industry's most common arguments, the Tribune identified flaws so basic they violate central tenets of science.

'Bogus' conclusions

When Babrauskas and his team of scientists began their pioneering research in 1987, it was well-established that flame retardants slowed fires — at least when massive amounts were packed into products.

Less clear was what that meant in terms of precise gains in fire safety. Seeking answers, the chemical industry commissioned Babrauskas' team at the National Bureau of Standards to conduct one of the first large-scale studies on the effectiveness of flame retardants.

The industry, Babrauskas said, wanted to know what would happen if the most potent and expensive chemicals were embedded in common items, such as TV cabinets and upholstered chairs. The industry picked out the flame retardants to be used, and Babrauskas' team began custom-building the household items to be tested.

Working out of a yellow-brick laboratory with a large chimney, the researchers set fire to each item and then, in what Babrauskas called the "grand finale," ignited a room full of samples containing large amounts of retardants and a room of items containing none. Among the conclusions: The room

of flame retardant samples would provide people 15 times more escape time than the other room.

The results weren't surprising. More noteworthy was the way industry misrepresented the results.

For example, the Bromine Science and Environmental Forum has regularly cited the 15-fold increase in escape time to argue that the flame retardants in everyday household products, such as TVs, save lives. "This should allow sufficient time for the fire brigade to reach your place before it is too late," states the website of the forum, a Brussels-based industry group that is funded by the largest makers of flame retardants.

Babrauskas calls such claims "totally bogus" because the amounts of flame retardants in the burned samples in his tests were so much greater than what is found in typical consumer items.

"Where you would see them is in the aviation industry, NASA, naval facilities — the market where there is no sensitivity to dollar costs," he said.

In fact, as Babrauskas explicitly noted in his study, research shows that the flame retardants in household furnishings such as sofas and chairs do not slow fire.

Many couches, love seats and chairs sold nationwide contain flame retardants to comply with a California flammability rule. But studies by the U.S. Consumer Product Safety Commission have concluded that this standard provides no meaningful protection from deadly fires.

The standard requires that raw foam withstand a candle-like flame for 12 seconds. But, Babrauskas said, upholstered furniture is covered with fabric, and if the cover ignites, the flames from the fabric quickly grow larger than that of a candle and overwhelm even flame retardant foam.

"The fire just laughs at it," Babrauskas said.

The bottom line: Household furniture often contains enough chemicals to pose health threats but not enough to stem fires — "the worst of both possible worlds," he said.

Babrauskas, who spent 16 years as a fire scientist at the National Bureau of Standards, now known as the National Institute of Standards and Technology, said he didn't know the chemical industry was misrepresenting his study until two years ago when a scientist at the Lawrence Livermore National Laboratory in California contacted him. Babrauskas addressed the distortion in a paper he presented last year at an international conference, but the industry continues to misquote his work.

In its written statement, the chemistry council said the group has not mischaracterized Babrauskas' study, saying the group has stated the research shows flame retardants "can provide" a 15-fold increase in escape time.

Babrauskas, now a consultant, said the industry is being "flat-out deceptive" and should stop misrepresenting his work in order to sell more flame retardants. "I don't want to be part of anything that willfully and needlessly poisons the planet," he said.

Tiny study, big claims

The report written in Swedish is so obscure you won't find it online or among the millions of papers listed in government and industry databases. The American Chemistry Council says it doesn't have a

copy. Even the chemicals' most vocal critics say they have never seen one.

Yet the paper about electrical fires in Sweden has had significant influence, thanks to the chemical industry's manipulation of its findings.

The Tribune obtained a copy of the study from the only library in the world believed to have one, the National Library of Sweden, and had it translated. The 50-page report, written by a Swedish federal board, estimated the total number of electrical fires in Sweden by analyzing the causes of all fires in and around western Stockholm in 1995 and 1996.

The report's main conclusion — that electrical fires in Sweden were less common than previously thought — was relatively insignificant. But a chemical industry team zeroed in on a tiny portion of the report and used it to manufacture several flimsy arguments for why flame retardants are good for society.

At the time the Swedish report was published, in 1997, environmentalists in Europe were raising concerns about flame retardants in TVs and other electronics. The chemical industry began searching for evidence that the benefits of flame retardants in those products outweighed any risks.

Leading the search were three people with close industry ties: an executive with flame retardant maker Albemarle Corp.; a public relations specialist with a unit of Burson-Marsteller, a global PR firm; and Margaret Simonson, a fire scientist at a leading research institute in Sweden.

The three were collecting statistics on electrical fires when some data in the Swedish study caught their eye: Western Stockholm, with 265,000 residents, experienced 32 electrical fires in a two-year span. Of those 32 fires, eight — or 25 percent — were caused by TVs.

A basic principle of science is that broad conclusions should not be based on small or unrepresentative samples. Flip a coin five times and it might land on heads each time. But you couldn't then conclude that 500 coin flips would always come up heads.

Yet the three industry researchers used the 25 percent figure to estimate that Europe as a whole — a region of roughly 500 million people — had experienced 165 TV fires per million sets annually.

That rate, the researchers wrote, was far higher than the U.S. rate, which they put at five TV fires per million sets. And because the outer plastic casings of televisions in the U.S. typically contained flame retardants, while European sets did not, the researchers concluded that the "dramatic difference" in TV fire rates was due to the chemicals.

When the researchers published their figures in 2000 in a peer-reviewed journal, one of the authors listed was the PR specialist.

Simonson, the fire scientist, went on to write several additional papers — all funded by the flame retardant industry — that also relied on the eight fires as support for her broad conclusions.

For example, in a 2002 study that looked at the environmental impact of TV sets, Simonson concluded that sets with flame retardants actually are responsible for lower emissions of certain hazardous pollutants over their lifetimes than TVs without retardants. This is primarily because, she wrote, TVs with retardants are involved in fewer and smaller fires, so they produce less smoke.

Industry repeatedly has pointed to this study when addressing environmental concerns about flame retardants.

Simonson's figures have been quoted far and wide. European regulators credited her statistics for prodding some international TV manufacturers to add flame retardants to sets sold in Europe.

One of the few to question Simonson's studies has been Tom Muir, a retired analyst for Canada's environmental protection agency.

He translated bits of the obscure Swedish report but said he couldn't entirely understand Simonson's methodology. In an interview with the Tribune, Muir said her studies appeared to be "an elaborate, manufactured platform of assumption strings and assertions and extrapolations."

When the Tribune provided Muir with a complete translation of the Swedish study as well as Simonson's responses to the newspaper's questions about her methods, Muir was even more critical.

"It's worse than I thought," he said, noting that Simonson repeatedly estimated crucial statistics when solid data did not exist. "She's just making these numbers up."

Also critical of Simonson's calculations is the author of the Swedish study that Simonson relied on in her work.

Ingvar Enqvist said in an interview that he did not know Simonson and the chemical industry were relying on the eight TV fires mentioned in his report as the basis for sweeping claims about the benefits of flame retardants, a fact he called "a little peculiar." He also said Simonson shouldn't extrapolate the eight fires to all of Europe, given the vast differences among the countries.

Simonson, who now uses her maiden name and goes by Margaret Simonson McNamee, is a research manager at the SP Technical Research Institute of Sweden. She denied Muir's accusation of fabricating numbers but acknowledged using many statistical extrapolations and assumptions because, she said, solid data were scarce.

"We certainly did the best that we could given the data that we had available," she said. She added that a British study had found similar TV fire rates in various European countries, so she thought it was fair to extrapolate the blazes in Sweden to all of Europe.

Simonson emphasized that her methods were transparent, allowing critics to redo her studies with different numbers if they like. "Part of the scientific process is having a dialogue and not necessarily being in agreement with your peers," she said.

Besides receiving industry money for her research, Simonson chairs the science advisory committee of the National Association of State Fire Marshals, a group of American public officials that has worked closely with the chemical industry to push for wider use of flame retardant products.

But Simonson said she has never skewed findings to suit industry needs. "Marketing material is something that they produce themselves," she said. "Our research was independent research."

Muir disagrees. "She's never erring on the other side," he said. "Her numbers are always pointing in the same direction — in industry's favor."

'Industry loves him'

When chemicals receive bad publicity, industry has a go-to person: Dennis Paustenbach.

A veteran toxicologist and industrial hygienist, he has sided with industry on some of the most controversial health issues. Working for tobacco industry lawyers, Paustenbach disputed federal regulators' conclusion that secondhand smoking causes lung cancer in adults. His industry-supported work was used to cast doubt on the risks of some occupational exposures to benzene and asbestos, two carcinogens.

"Industry loves him," said Peter Infante, a former senior administrator with the U.S. Occupational Safety and Health Administration. "They know what answer they are going to get. Nothing is ever harmful."

For the makers of flame retardants, Paustenbach helped interpret data about whether a widely used retardant posed a risk to children.

In 2002, concerns had been growing about a flame retardant known as deca that was being added to TVs and other electronics. The U.S. Environmental Protection Agency wanted more information about possible health risks to children, and chemical manufacturers volunteered to collect data and present them to an EPA-sponsored panel of industry, government and university researchers.

For help, the chemical-makers hired Exponent Inc., a California-based scientific consulting firm where Paustenbach served as vice president. After analyzing various ways children might be exposed to deca, including inhaling dust and chewing on consumer products, Paustenbach's company wrote a 123-page report concluding the chemical posed little risk.

But its conclusions had a weak foundation: They were based to a large degree on a study of serum samples collected from just 12 adult blood donors in Illinois in 1988. Again, the chemical industry used a small sample to reach a broad conclusion.

In the Illinois blood study, researchers from the Centers for Disease Control and Prevention and Stockholm University found that five of the 12 serum samples had detectable amounts of deca. But when Paustenbach's firm wrote up its report for the chemical industry, it flipped the findings around, emphasizing the seven samples where none of the chemical was detected.

"Given that the majority of serum samples tested had non-detectable levels of (deca), it is most likely that the majority of the U.S. population has very low, if not zero, exposure," the report states.

The industry's report also stated — contrary to the conclusion of the Illinois blood donor study — that no further evaluation of the flame retardant was warranted.

When the EPA panel of researchers reviewed the industry report, many members objected. They said the risk to the nation's children should not lean so heavily on just 12 blood samples, let alone samples from adults, who tend to be less vulnerable to chemical exposure. Some members also noted the samples were collected in 1988, when levels of deca in the environment might have been lower.

Industry officials "were trying to pull a fast one," recalled panel member Ruthann Rudel, a toxicologist at the Silent Spring Institute, an environmental research organization.

Paustenbach and five others went on to write up the report for a peer-reviewed journal, which can lend the results of a study more credibility.

Their paper was published in the Journal of Children's Health — a year-old publication edited by Paustenbach.

In an interview, Paustenbach said it was appropriate to publish the report in a journal that he edited. He also defended the report's use of the small sample of Illinois blood donors to cast doubt on the health risks of deca. "We did the best job we could with the available data," he said.

Paustenbach is now president and founder of ChemRisk, a San Francisco-based consulting firm, and an adjunct professor of toxicology at the University of Michigan. Regarding criticism of his work for industry on controversial topics, he said: "It's unfortunate there is such polarization in the environmental sciences on views on chemicals."

In 2009, the three largest manufacturers of deca reached an agreement with the EPA to phase out sales of the chemical by the end of next year.

The journal that Paustenbach edited folded a few months after the questionable paper was published. Paustenbach said it closed because of competitive pressures.

It was in existence less than two years.

sroe@tribune.com

pcallahan@tribune.com

Chicago Tribune
Breaking News, Since 1847

WATCHDOG

PART FOUR OF FOUR

May 10, 2012

Toxic roulette

Firemaster 550, touted as safe, is the latest in a long line of flame retardants allowed onto the market without thorough study of health risks

By **Michael Hawthorne**, Chicago Tribune reporter

By the early 2000s, the flame retardant known as penta had become a villain.

Packed by the pound into couches and other furniture, the chemical was turning up in the blood of babies and in breast milk around the world. The European Union voted to ban penta after researchers linked it to developmental and neurological problems in children, and manufacturers pulled it from the market.

But the only U.S. company that made penta soon introduced a replacement, hailing it as the beginning of an eco-friendly era for flame retardants.

The new product even had a heroic name: Firemaster 550.

TheU.S. Environmental Protection Agency, whose mission is to safeguard America's health and environment, praised the withdrawal of penta as a "responsible action" and promised that the new flame retardant had none of the problems of the old one. Unlike penta, Firemaster 550 would neither stick around in the environment nor build up in people and wildlife, a top EPA official declared in a 2003 news release.

Not everyone at the EPA believed that rosy public assessment. Documents obtained by the Tribune show that scientists within the agency were deeply skeptical about the safety of Firemaster 550, predicting that its chemical ingredients would escape into the environment and break down into byproducts that would pose lasting health hazards.

Behind the scenes, agency officials asked the manufacturer to conduct basic health studies, citing the same concerns that forced penta off the market.

Today, in sharp contrast to the promises of industry and government, chemicals in the flame retardant are being found everywhere from house dust in Boston to the air in Chicago. There also are signs the chemicals are building up in wildlife, prompting concern that Firemaster 550 or its byproducts could be accumulating in people.

The manufacturer's own health studies, obtained by the Tribune, add to that troubling picture. They found that exposing rats to high doses of Firemaster 550 can lower birth weight, alter female genitalia and cause skeletal malformations such as fused ribs and vertebrae.

The history of Firemaster 550, pieced together through records obtained under the Freedom of Information Act, highlights how EPA officials have allowed generation after generation of flame retardants onto the market without thoroughly assessing health risks.

The previously unreleased documents also show how the nation's chemical safety law, the 1976 Toxic Substances Control Act, gives the government little power to assess or limit dangers from the scores of chemicals added to furniture, electronics, toys, cosmetics and household products.

At a time when consumers clamor for more information about their exposure to toxic substances, the chemical safety law allows manufacturers to sell products without proving they are safe and to treat the formulas as trade secrets. Once health effects are documented, the law makes it almost impossible for the EPA to ban chemicals.

A growing list of critics — including the nation's leading group of pediatricians and the Government Accountability Office, the investigative arm of Congress — are calling for a sweeping overhaul of the law. Some compare the situation to Whac-A-Mole, the carnival game where plastic moles keep popping out of holes even after a player smacks one down.

"By the time the scientific community catches up to one chemical, industry moves on to another and they go back to their playbook of delay and denial," said Deborah Rice, a former EPA toxicologist who works for the Maine Center for Disease Control and Prevention.

Chemtura Corp., the Philadelphia-based company that makes Firemaster 550, said in a statement that the flame retardant is safe for use in polyurethane foam, the kind often used in furniture. The company also said the studies that found Firemaster 550's chemical ingredients in homes and wildlife don't prove that those compounds came from its product.

Introducing Firemaster 550 "was an early example of our strategy of Greener Innovation and the success it could have, even under significant EPA scrutiny," the company said.

Nevertheless, the EPA is now concerned enough that in February it targeted two of Firemaster 550's key ingredients for a "high priority" review, citing potential health hazards and widespread exposure from household products.

"We didn't think it would bioaccumulate, but it turns out that prediction isn't borne out by reality," Jim Jones, the EPA's top chemical safety official, said in an interview. "We want to make sure we understand it and that nothing bad is going to happen."

Solving a mystery

When Firemaster 550 replaced penta, its chemical makeup was a mystery to all but the manufacturer and a select group of EPA employees who were sworn to secrecy. That made it difficult for outside scientists to identify its ingredients in the environment and determine if they are harmful.

Not until two young, independent chemists revealed the formula of Firemaster 550 did it become clear how far the flame retardant had spread in just a few years' time.

One of the chemists, Duke University researcher Heather Stapleton, was among the first scientists to figure out that most human exposure to flame retardants comes from ingesting surprisingly large amounts of contaminated household dust, rather than from people's diet or what they absorb through their skin.

Young children are exposed to significantly higher levels than adults, the EPA has since concluded, primarily because they spend so much time playing on the floor.

Stapleton's interest in the chemicals started during graduate school in the late 1990s, when she was sent to Lake Michigan to monitor water pollution. Her discoveries in the Great Lakes helped document how penta and related flame retardants were spreading around the world, just like the banned pollutants DDT and PCBs.

She knew that many flame retardants in the U.S. are made with bromine or chlorine, chemicals known as halogens that take the place of oxygen and slow the combustive reaction that creates and spreads fire.

But other researchers have found that the way flame retardants are used in household furniture doesn't protect people from fire in any meaningful way. And because of their chemistry, some of the most popular flame retardants spread easily and widely, persist in the environment and build up in the food chain.

In 2006, Stapleton discovered two mystery chemicals with high levels of bromine while analyzing dust samples from homes in Boston. The chemical structures didn't show up in standard databases.

Around the same time, Susan Klosterhaus, a friend of Stapleton's, got a job studying environmental contamination in San Francisco Bay. Mindful that Californians have some of the world's highest recorded levels of flame retardants in their bodies, Klosterhaus wanted to know if Firemaster 550, the penta substitute promoted by the EPA, was showing up in the bay.

Like others at the time, Klosterhaus had no way to test for it because its formula was secret.

To solve the puzzle, she did two things: She sent Stapleton a small piece of foam from her new couch, and she called Chemtura to ask for a sample of Firemaster 550. To her surprise, the company sent a half-liter bottle containing an oily mixture the same color and thickness as maple syrup.

Stapleton analyzed the substance and confirmed the two chemists' suspicions. The foam from the couch and the Boston dust samples both contained ingredients of Firemaster 550.

The scientists had identified a new pollutant. Without more study, though, there was no way to determine if it was dangerous.

"We end up finding a chemical mixture that's produced in large volumes, yet there was next to nothing available in the public scientific literature about whether or not it might be harmful," Klosterhaus said.

In May 2010, at a conference where Stapleton was speaking to foam manufacturers about her dust studies, Chemtura distributed a letter to the audience. It acknowledged that one of the company's own animal studies had shown that Firemaster 550 had "some effects" on prenatal development.

Even so, the letter said, there was nothing to worry about because the company had found that the fire retardant doesn't escape from treated products, indicating that "the risk of exposure … is negligible."

The Tribune obtained a copy of the study Chemtura cited in the letter. It involved researchers placing saline-soaked filter papers on a cotton-covered block of foam and observing whether Firemaster 550 leached out during the following eight days.

"The study was designed to simulate potential migration from direct skin contact with the foam, and also oral contact, such as a person chewing on the foam," the company said in a statement.

The study, the company said, "showed no detectable migration from the foam."

Independent scientists say the Chemtura study was flawed. Other research has found that flame retardants escape from products over periods of time far longer than eight days.

Moreover, Firemaster 550's brominated chemicals have turned up not only in common household dust but in sewage sludge around San Francisco Bay, polar bears in the Arctic, harbor seals off the coast of Maine, mollusks in North Carolina and porpoises in the South China Sea.

Indiana University researchers reported in November that airborne concentrations are rising in Chicago and other cities around the Great Lakes as well as in more remote areas, such as Michigan's Upper Peninsula.

So far, little is known about whether Firemaster 550 is building up in people. Early research suggests that its brominated compounds quickly break down into other chemicals in the body, so scientists are studying if they can track those byproducts in blood or breast milk.

"It's ridiculous that they would keep saying this isn't migrating from couches and other products," Stapleton said. "We know this chemical is out there, and we know kids are chronically exposed to it."

Few health studies

EPA officials acknowledge they know little, if anything, about the safety of not only Firemaster 550 but most of the other 84,000 industrial compounds in commercial use in the U.S.

Unlike Europe, where companies generally are required to prove the safety of their chemicals before use, U.S. law requires manufacturers to submit safety data only if they have it. Most don't, records show, which forces the EPA to predict whether chemicals will pose health problems by using computer models that the agency admits can fail to identify adverse effects.

The EPA can require studies of new chemicals that it anticipates could affect people's health — as it did with Firemaster 550 — but this step is rare, and the research doesn't need to be completed before the chemicals are sold.

To ban a chemical already on the market, the EPA must prove that it poses an "unreasonable risk." Federal courts have established such a narrow definition of "unreasonable" that the government couldn't even ban asbestos, a well-documented carcinogen that has killed thousands of people who

suffered devastating lung diseases.

When the EPA approved Firemaster 550, the agency knew that it contained two brominated compounds, known as TBB and TBPH. Both are structurally similar to a plastic-softening phthalate that Congress has banned in children's products. Called DEHP, the phthalate is listed in California as a known carcinogen and developmental toxin.

EPA scientists also have known since the mid-1990s that burning products containing TBB could release highly toxic dioxins, records show.

The only health studies of Firemaster 550 conducted to date are two Chemtura-funded papers that the company submitted in 2008 at the EPA's request, five years after the agency declared it was safe.

The effects seen in some of the test rats, such as low birth weight and skeletal malformations, often lead to more serious health problems later in life. Yet the industry researchers repeatedly dismissed those effects as "spurious," "unclear" or "incidental," saying the problems weren't seen in all of the animals or when different doses were tested.

The company said its animal tests found no harmful effects at levels "expected to be seen in the environment" and proved that Firemaster 550 is "acceptable for use in the applications for which it was intended."

Stapleton and Heather Patisaul, a toxicologist at North Carolina State University, now are researching whether low doses of the brominated chemicals in Firemaster 550 could cause harm. Scientists increasingly are finding that the body can mistake tiny amounts of certain chemicals for hormones.

Based on earlier findings about such endocrine disrupters, including penta, Stapleton and Patisaul are looking for signs that Firemaster 550 could mimic or block hormones during critical stages of development.

"This is not a case where we are looking for missing arms and legs," said Linda Birnbaum, director of the National Institute of Environmental Health Sciences and a veteran government scientist who has raised concerns about toxic chemicals for years. "We're looking at reduced ability to learn, altered behaviors, decreased sperm count, premature ovarian failure — things that are more difficult to pick up in the standard studies."

EPA officials said they still think penta is more toxic than Firemaster 550, but they acknowledge missing some of the early warning signs about the newer flame retardant. They blamed the agency's delayed response on a lack of sufficient staff and funding to assess hundreds of new chemicals introduced by industry every year.

"We are always learning," said Jones, the EPA's acting assistant administrator for chemical safety and pollution prevention. "We want to make sure we have a better understanding of the human health and ecological risks before we commit to any course of action."

'Why do we not learn?'

Last year, Stapleton was back in her lab testing for flame retardants, this time in baby products.

About a fifth of the nursing pillows, car seats, highchairs, diaper-changing pads and other products made with polyurethane foam contained Firemaster 550, she found. But the most common flame retardant detected was another chemical: chlorinated tris, also known as TDCCP.

Of all the flame retardants used over the years, chlorinated tris is one of the most notorious. Manufacturers voluntarily took it out of children's pajamas more than three decades ago after it was linked to cancer.

Scientists and regulators thought chlorinated tris had all but disappeared from the marketplace. But because it wasn't banned, companies could legally use it in other consumer products without informing government officials or the public.

After penta was pulled from the market, chlorinated tris joined Firemaster 550 as the most widely used flame retardants in household furniture.

Chemical companies say chlorinated tris is safe. The American Chemistry Council, the industry's leading trade group, declined to answer specific questions but emailed a link to its position paper, which states that a 2008 risk assessment by the European Union found "no concerns for consumers in relation to carcinogenicity from potential inhalation or exposure to children via the oral route."

But several other major health and regulatory agencies have identified the flame retardant as a cancer risk, including the World Health Organization, National Cancer Institute and National Research Council.

In 2006, researchers at the U.S. Consumer Product Safety Commission cautioned that adding chlorinated tris to furniture would expose children to nearly twice the daily dose deemed acceptable by the federal agency. The cancer risk for children during the first two years of life would be seven times higher than what most physicians, scientists and regulators consider acceptable, according to the safety commission's report.

"Industry has had years to come up with safer alternatives," said Arlene Blum, a University of California at Berkeley chemist whose 1977 study helped pressure manufacturers to take chlorinated tris out of children's sleepwear. "They can't do better than this?"

In a statement, the EPA said it is largely powerless to do anything about chlorinated tris. The agency cited industry's continued use of the chemical as a stark example of why it supports "much needed reform" of the nation's chemical safety law.

Jerome Paulson, a George Washington University pediatrician who last year wrote a stinging critique of the law for the American Academy of Pediatrics, said the system especially fails to protect children. The group wants safety standards for industrial chemicals to be more like those governing pharmaceuticals and pesticides, with chemicals being approved only if a "reasonable certainty of no harm" can be verified.

Birnbaum and Ake Bergman, a Swedish researcher who was one of the first to sound alarms about penta building up in mothers and babies, wrote a 2010 editorial in the journal Environmental Health Perspectives that summed up the scientific community's frustration with the lack of oversight.

"Why do we not learn from the past?" they asked.

With the federal government failing to take action, more than a dozen states are considering legislation that would ban chlorinated tris in children's products. This spring, Washington state legislators rejected such a ban amid heavy lobbying from the Citizens for Fire Safety Institute, a front group for the world's largest makers of flame retardants.

Last year, however, California added chlorinated tris to its Proposition 65 list of cancer-causing chemicals.

That means consumers shopping for furniture and baby products might soon be confronted with two labels: one meant to reassure them that the product meets the state's flammability standards and another to warn them about a chemical linked to cancer.

Aware that new warning labels might scare away customers, Chemtura already is marketing an alternative flame retardant called Emerald NH-1. The company's website describes the chemical as a member of its "new family of high-performing, greener fire safety solutions."

The company says the polymer-based substance doesn't contain bromine or chlorine, the troublesome chemicals in other flame retardants.

But the ingredients remain a trade secret.

*Tribune reporter **Patricia Callahan** contributed.*

mhawthorne@tribune.com

Twitter @scribeguy