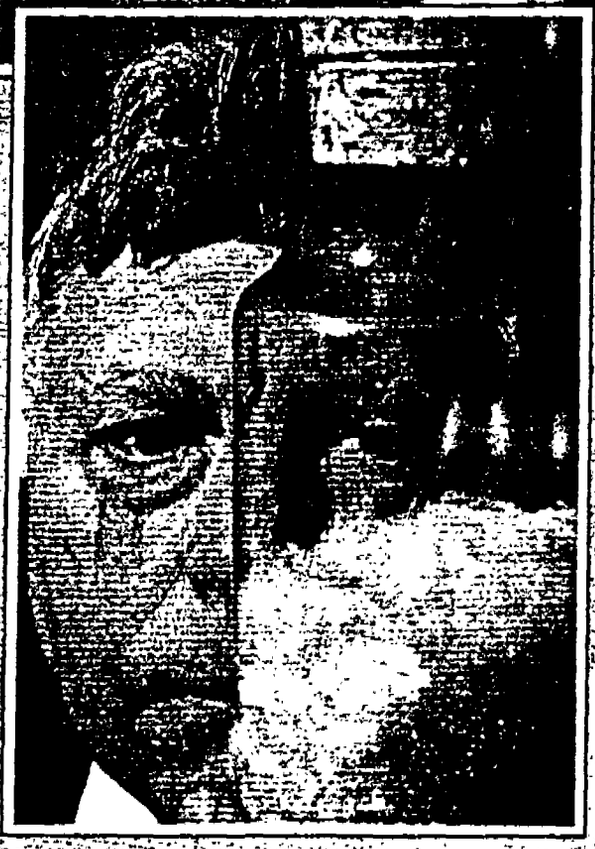
The Sunday Record
NORTHERN NEW JERSEY DECEMBER 23, 1984



Plastic bottles, above; plastics recycler Frank Tammera, right.

Staff photo by Rich Gigli

Plastics just won't fade away

By Janny Scott
Staff Writer

When plastic soda bottles started shouldering glass off supermarket shelves six years ago, they were touted as lightweight, unbreakable, flexible, tough — the ultimate consumers' dream.

The plastic bottle revolution has come home [illegible], like the sea gulls on New Jersey's landfills. Plastic trash is the state's newest solid-waste problem, and it has triggered talk of radical solutions.

"The industry has created a very big pollution problem, and it's inherently built into the industry," said Barry Commoner, the biologist, environmentalist, and former presidential candidate.

[illegible] to ask is, is this the best way to produce chairs, floors, clothing?" said Commoner. "This is a social issue that has to be examined. No one has had the guts to do it."

In October, New Jersey officials threatened desperate measures to deal with the fact that a

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growing percentage of the state's trash does not biodegrade, is not being recycled, and in some cases cannot safely be burned.

They ann unced that if the plastics and packaging industries don't begin collecting and recycling plastic containers, New Jersey might consider taxing some and banning others.

Industry officials reacted quickly, faced with a potentially sticky public-relations problem. They signed on for meetings with the state and began talking of recycling demonstration projects and cooperative ventures.

But they appeared to be pinning their hopes on a small group of independent entrepreneurs pioneering in the still-unproven field of plastic recycling. Whether they will succeed remains in doubt.

"My personal feeling is that's smoke and mirrors," said one skeptic, Maurice Sampson, recycling coordinator for the City of Newark, "because the economics aren't there."

Untold amounts

How much plastic is in New Jersey's "waste stream" is not clear. It probably varies from place to place, but estimates put the percentage by weight at as high as 10 percent. By volume, it's much larger.

What is more significant is the rate of increase, officials say. Mary T. Shiel, administrator of the state Office of Recycling, figures the amount of plastic in trash has increased fivefold in five years.

Perhaps the most remarkable growth has come in the area of lightweight, transparent soda bottles, the polyethylene terephthalate (PET) bottles now shoulder-to-shoulder on supermarket shelves.

PET bottles were introduced in 1978. Within five years, they cornered 21 percent of the soft-drink market. They are expected to take an additional 15 percent annually, industry figures show.

Meanwhile, PET liquor bottles, introduced last year, could corner a quarter of the market by 1987. Production of PET cans for Coca-Cola begins next year. Plastic beer cans are being discussed.

Fifteen to 18 percent of all PET bottles are recycled nationwide. But in New Jersey, most plastic bottles end up in landfills.

Spurred by bottle laws

Bottle laws like the one passed last year in New York State have accelerated the switch. Consumers gravitate toward plastic when they have to return bottles intact to the store. Beverage companies know that.

In New Jersey, most plastic bottles end up in landfills. Industry officials say 15 to 18 percent of all PET bottles are recycled nationwide. But the few New Jersey communities that have tried recycling plastic have failed.

The main problem is that plastic containers have a low material density and low intrinsic value, Ms. Shiel said. Those qualities make them ideal for packaging, but uneconomical to collect and sell.

A small quantity of bottles, worth little, quickly fills a truck. Towns don't have the equipment to bale them and can't amass enough to satisfy a buyer. So collecting them costs more than the plastic is worth.

What is needed, Ms. Shiel believes, is a reliable system of collection and processing. Manufacturers would buy the material if they were assured of a steady supply. Towns would collect it if they were assured of a price.

Pressure on industry

So last month Ms. Shiel suggested giving the industry 18 months to develop a collection system. If it has nothing by July 1986, the state should consider requiring a deposit on all plastic "one-time use" containers.

The deposits — graduated from 10 cents to 25 cents depending on the size of the container — would enable the state to pay for a plastic recycling and processing program of its own, she said.

She recommended a more drastic solution for polyvinyl chloride and polyvinyledene chloride, two plastics that are used increasingly in packaging but which emit hydrochloric acid when burned and are especially difficult to sell for reuse.

The state should consider banning them from packaging, Ms. Shiel recommended in a report to the legislature, unless manufacturers find a way to recycle them.

"Our position is the industry is making these products and they can't cut off the handling of them at the supermarket shelf," Ms. Shiel said in a recent interview. "They can't just dream up ways of packaging a product without thinking about the waste."

Immediate response

The threat evoked an immediate response. Industry officials have agreed to work with the state toward a cooperative program, possibly including a research center at a state university, Ms. Shiel said.

Plastic industry people insist any problems with plastic recycling are simply kinks to be worked out, that the technology is in its infancy and has yet to mature.

So far, PET bottles are being recycled into fiberfill for jackets and sleeping bags, strapping for industrial pallets, and moulded products. Some also goes into fiberglass-reinforced products like shower stalls and sinks.

Industry officials put the potential demand for reprocessed PET at about 1.3 billion pounds, based on projections from current markets, said Hal Hart of the Plastic Bottle Information Bureau in New York City.

What must be done is turn that potential demand into reality, he said.

Purity standards

Toward that end, the information bureau hopes to develop standards of purity for reprocessed PET. It has published a national directory of the 33 processors that prepare bottles for reuse, and regularly writes about recycling in its Plastic Bottle Reporter.

Meanwhile, the Society of the Plastics Industry hopes to develop a system of grading reprocessed plastic. Without standards, manufacturers simply use virgin materials to be certain of high grades of quality, said John Lawrence, technical director of the society.

The society also has plans for a national plastic recycling demonstration plant, he said. Its aim would be to convince consumers that there are uses for old bottles, and to attract entrepreneurs into the business.

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Mom-and-pop outfits

But most of those in the field are mom-and-pop operations experimenting with unproven technologies. Plastic recycling remains a primitive art, incapable of producing recycled bottles that meet federal safety standards.

The plastics society doesn't even know how many manufacturers use reprocessed plastic, Hart said. Some may be reluctant to make it known because the public may not be ready, he said.

Meanwhile, the demonstration project, which is supposed to be a joint effort by plastic producers and the packaging industry, is still merely an idea. It is not targeted for a particular state, Lawrence said.

Asked how the industry will respond to New Jersey's threat, Lawrence said simply, "We are going to be in communication there in New Jersey to try to work out some plans."

Some remain doubtful about the prospects for plastic recycling.

Sampson, the Newark recycling coordinator, wonders if there is sufficient economic incentive for manufacturers to use reprocessed plastic over virgin materials. He suspects demand for reprocessed plastic is severely limited.

"How many down jackets can you make? How many boats can you make?" Sampson asked. "The one I like best is polyester suits. How many polyester suits are you going to make?"

Sampson suggested that the industry exaggerates the prospects for recycling while it steadily takes over the beverage bottle and packaging markets. He and others mention rumors, which the industry denies, that the industry is buying back used bottles but "land-banking" them in the South.

Sampson fears that once plastic corners the market, there can be no turning back. The less glass there is to collect, the less will be recycled. He predicts a time when there would be no glass recycling.

"The real threat here is as we go into more and more plastic containers and packaging, we decrease our opportunity to recycle," he said. "There are real horors in my mind with an all-plastic waste stream, because all you can do is burn it."

And that raises new questions.

Commoner, a professor of Earth and Environmental Sciences at Queens College in New York City who has studied the kind of incinerators currently proposed for Bergen and Passaic counties, contends burning plastic with paper produces the toxic chemical dioxin.

Although Environmental Protection Agency officials have said any dioxin would be destroyed by burning the trash at a sufficiently high temperature, Commoner disagrees, arguing that the dioxin is formed in the smokestack.

He says no air pollution control device can yet control the emissions.

Acid emissions

Another concern is acid gas emissions from burning plastics that contain significant amounts of chlorine, said William O'Sullivan, chief of engineering and technology in the state's air pollution control program.

"It's probably not a major health concern near the plant," he said. "However, we are concerned about the cumulative impact of acid gases being emitted into the atmosphere."

O'Sullivan said New Jersey is requiring air pollution control "scrubbers" to minimize the emissions, which could contribute to acid rain. But he said no scrubbers achieve a 100-percent reduction.

Commoner contends that problems like New Jersey's point to a larger question: "The real problem is, do we need to make all these plastics?"

Commoner contends there are few unique new uses for plastics. Instead, plastics invade existing fields, like packaging, and replace products that were once widely used.

"The disadvantage is that the industry that produces these things is inherently polluting," he said. "And the stuff they make can't be gotten rid of without polluting the environment — which is not true of cotton."

New Jersey is not the first state to consider regulating plastic: Vermont threatened it and Minnesota tried it. In both cases, the plastic industry won.

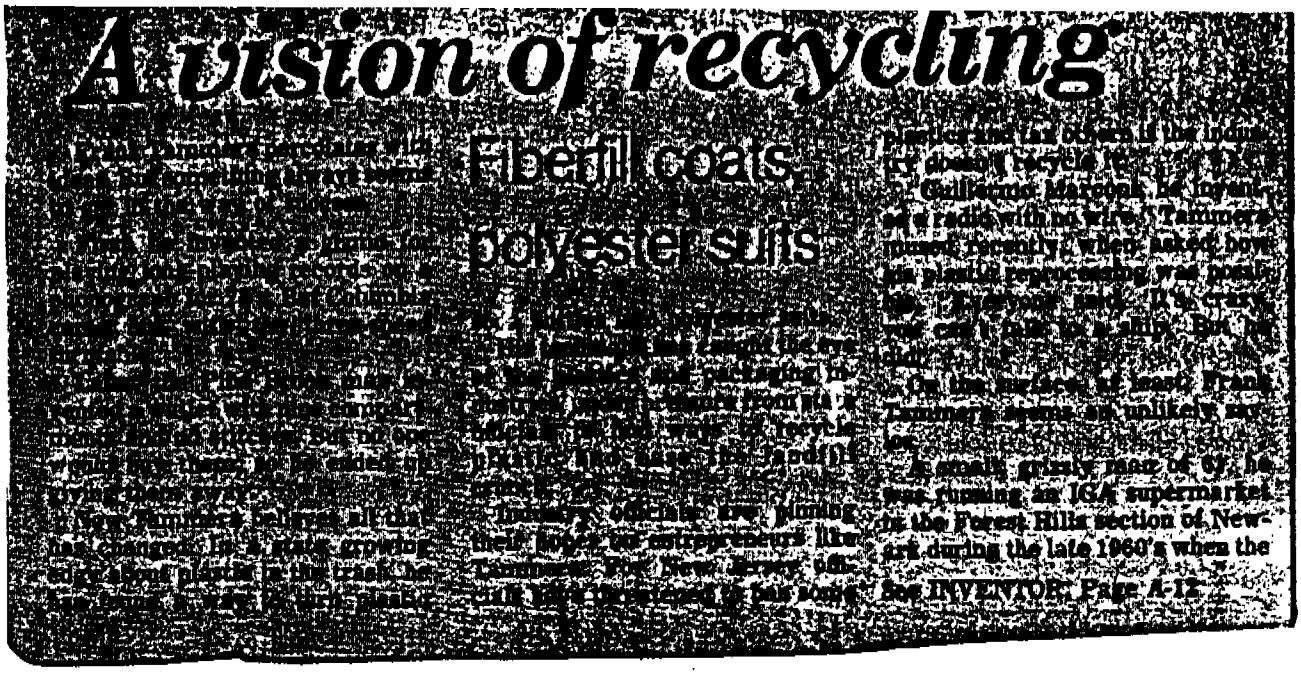
In Vermont, the legislature considered a bill to require plastic bottle manufacturers to file a recycling plan with the state, said Andre Rouleau, administrator of the beverage container law in Vermont.

But he said the proposal was dropped after the state received "a kind of unofficial commitment" by the plastic industry to buy the plastic containers returned to Vermont distributors.

He said the industry has met its commitment. Most of the bottles are taken out of state, where Rouleau said he believes that most are recycled and up to 30 to 40 percent are stockpiled for future use.

In Minnesota, the industry challenged one proposal to ban plastic milk bottles and another to require any new packaging be reviewed by a control board that would consider disposal problems, Lawrence said.

Once again, the industry said the issue was consumers' choice. Lawrence said the industry successfully argued in court that the laws deprived Minnesota consumers of their right to state-of-the-art products.



Inventor banking his firm's future on recycling plastics

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riots dampened his enthusiasm for the work.

One day, his insurance man, who had a silk-screening business, brought Tammera a challenge: You're inventive, the insurance man said; find an efficient way of removing defective silk-screened labels from plastic bottles.

Tammera and his wife, Elvira, quit the supermarket. She got a job in an office and he holed up in the family garage in Livingston. He pressed the family stove and washer-dryer into service and embarked upon a two-year quest.

Plastic bottles sloshed around in a barrel propped up on a rocking chair in the garage, while Tammera sat in the kitchen, talked on the phone, and kept the chair in motion with a pulley and rope.

One day the vacuum cleaner attached to the barrel filled the garage with foam. There were late-night trips to laundromats to spin the plastic bottles on different cycles.

In the end, a bird cage, rigged with a metal shaft and two propellers, provided the prototype for Tammera's Polywasher. That was the bottle-cleaning machine; it led eventually to the plastic reprocessor.

But neighbors began asking questions about the truck traffic in the driveway. Accused by neighbors of running a business in a residential area, the Tammeras moved to a small plant in Morris County and set up Pure Tech Research.

For 10 years, Pure Tech's specialty was removing labels. Then polyethylene terephthalate (PET) plastic soda bottles surfaced in the late 1970's, and manufacturers asked Tammera if the stuff could be recycled.

Now Tammera says his seven-person firm turns some 30 million used bottles annually into transparent plastic flakes, which are sold for manufacture into things like polyester fiber, strapping, clothing, and tables.

Some skeptics wonder about the limits to plastic recycling. After all, asks Maurice Sampson, recycling coordinator for Newark, "How many polyester suits are you going to make?"

But the Tammeras call their flakes "the Rolls-Royce of reprocessed plastic." Selling reprocessed PET at less than half the price of the virgin material, Tammera says demand can only go up.

"It's profitable," he insists. "Otherwise, you won't stay in the business."

— JANNY SCOTT

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The Star-Ledger

The Newspaper for New Jersey U Newark, N.J. Monday, December 24, 1984

Essex pioneering trash incineration with dangerous plastics eliminated

By GORDON BISHOP

The proposed Essex County resource recovery plant—considered the most advanced garbage-to-energy technology in the world—is about to be made even safer with the removal of harmful plastics from the waste flow.

State government and the plastic industry, The Star-Ledger has learned, are moving to eliminate the last possible problem facing incinerators that convert waste into heat and electricity.

The final hurdle standing in the way of the cleanest energy recovery that modern technology can achieve is plastic packaging, which opponents of incinerators want removed from garbage before it is burned.

The "harmful" plastic accounts for less than one-tenth of 1 percent of the daily garbage, by weight.

But it's creating a monumental conflict between citizens and public officials in siting incinerators that convert garbage into energy.

State officials, however, say that even with that tiny bit of plastic in the garbage, incinerators can safely convert waste into energy, so safe in fact that the risk level has been reduced to one cancer case per 10 million population, far lower than any industrial operation today.

But opponents of incinerators want an "absolutely safe" operation, something that is regarded as physically impossible by public health authorities and insurance companies responsible for requiring the safest standards possible.

Although "zero risk" is an impossible goal in the real world, state government and the plastic industry are nevertheless responding to the plastic issue.

On the one front, the Society of Plastic Industries is establishing a Recycling Foundation that will elect a prestigious educational institution—either Rutgers, Stevens or New Jersey Institute of Technology—to come up with recommendations that will allow plastic to be recycled or incinerated with no harm to human health or the

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Photo by Richard Rosenberg

Plastic bottles, such as this one filled with cooking oil, cannot be recycled or incinerated

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environment.

At the same time, The Star-Ledger has learned, the State Departments of Energy and Environmental Protection are drafting a mandatory recycling bill that will require the coding of plastic packaging that incinerator opponents want recycled or converted safely into energy.

In addition, the State Recycling Office is pushing for a deposit on all plastic containers to prevent them from being thrown away as garbage.

All of these actions are in response to the state's efforts to build the "safest" garbage-to-energy plant in the United States on a 23-acre site along the lower Passaic River by the New Jersey Turnpike.

The Essex County incinerator, to be located in Newark, would be the most advanced waste conversion plant in the world, serving as the "model" not just for New Jersey but the rest of the nation seeking to turn garbage into heat and electricity without affecting the public health or the air, water and soil.

State health and environmental authorities, as well as chemical/plastic industry officials, are now working together to attack the PVC plastic problem, according to Robert Donovan, secretary-treasurer of the New Jersey Recyling Forum and an executive with Owens-Illinois, Inc., Saddle Brook, one of the nation's major manufacturers of glass and plastic packaging.

"The plastic industry has been moving along unresponsively to what's happening in recycling and resource recovery," Donovan admitted. "But all of that's changing now as the public and government are putting more and more pressure on the packaging industry to change its ways, or government will be forced to do it for them."

Donovan acknowledged that if the plastic industry does not respond to the problem, government will—with public support—ban the plastic container that opponents find an onerous burden in the recycling of waste.

"We've got to do something, otherwise government will be doing it for us," Donovan, a veteran lobbyist for the packaging industry, predicted.

John Lawrence, technical director of the Society of Plastic Industries, said a Plastics Research Institute would be established at a major educational center to deal with the issue of plastic recycling and incineration of plastic.

"All plastic packaging makes up only two to four percent of the solid waste flow, by weight," Lawrence, a chemical engineer, said. "The PVC plastic represents less than one-tenth of 1 percent."

Such plastic is used to wrap meats to prevent them from turning brown in the refrigerated display cases. PVC plastics are also used for food containers such as salad oils.

Combustion engineering experts say PVC chemical compounds break down at temperatures above 1,800 degrees, effectively eliminating any health risks.

Despite assurances from combustion and air pollution control experts, residents fighting the siting of incinerators in their "backyards" are not convinced the waste-to-energy system has yet been demonstrated to be foolproof, as long as the "bad plastics" remain in the waste flow.

At the crux of the debate is polyvinyl-chloride (PVC) which is used to make plastic wrappings and containers.

Since they represent such a small fraction of the solid waste flow, the Department of Environmental Protection (DEP) does not regard them as a waste disposal problem.

The DEP has encouraged the development of hi-tech incinerators as the most acceptable alternative to burying garbage in the ground where it can pollute the water, air and land.

Biologist Barry Commoner, the leading critic of both incinerators and the chemical industry, has singled out PVC as the big obstacle standing in the way of proper disposal of garbage.

Commoner, however, has advised Stephen Passage, manager of Port Authority's resource recovery projects, that "all other environmental problems can be resolved if PVC can be eliminated" in the conversion of waste to energy.

Commoner heads the Center for the Biology of Natural Systems at Queens College on Long Island.

The Port Authority of New York and New Jersey is a prime partner in the development of the $260-million, 2,277-tons-per-day Essex resource recovery plant.

Essex County Executive Peter Shapiro, who put together the team for the state's first energy recovery project, also holds the plastic industry responsible for producing materials that cannot be easily recycled.

"A product must reflect its true costs to society," Shapiro explained. "If it costs society more to deal with that product than its actual cost, then there's obviously no place for that product in the free enterprise system."

Shapiro was referring to the fact that plastic packaging may be cheap in the marketplace because society is forced to pay the "hidden costs" of taking care of that product after its useful life in the production-consumption cycle.

"No one wants plastic throwaways now because they have no value," Shapiro said. "It can't be recycled. It can be safely incinerated at extremely high temperatures and at a greater cost to those paying for garbage disposal."

The State Recycling Office has proposed placing a deposit on all plastic containers as one way of getting them out of the waste flow.

State Recycling Administrator Mary Sheil last October announced that a deposit on plastic containers would have to be imposed by July 1986 because plastic is harder to recycle than glass and metal packaging.

Sheil is implementing the 1981 Recycling Act, which calls for a 25 percent reduction in the volume of garbage by 1986 through the removal of newspapers, magazines and metal and glass containers that can be recycled.

The Recycling Act is being amended by the Recycling Office and state energy and environmental officials. The revised Recycling Act will be introduced by the Kean administration in January, according to State Environmental Commissioner Robert E. Hughey.

Barbara Greer, assistant director of the DEP's Office of Regulatory Services, said that one of the provisions of the proposed state mandatory Recycling Act is the coding of plastic containers to alert consumers as to their "recyclability."

If the coding system does not work, the Recycling Office is recommending a deposit on plastic containers.

Essex County will have a mandatory recycling system in place by the time its incinerator is in operation by late 1987 or early 1988, according to Shapiro.

"Garbage from Essex County's 22 municipalities will not be allowed to use the Newark incinerator until each community has its mandatory recycling system in place," Shapiro asserted.

The state will be taking the same approach through its proposed mandatory recycling act.

William O'Sullivan, chief of the DEP's Bureau of Engineering and Technology, said even without removing the PVC packaging from garbage, the health risk has been reduced—by the application of advanced technology—to a safety level of 99.99 percent.

That is the efficiency level of a hi-tech incinerator equipped with scrubbers and electrostatic precipitators or fabric filters, to remove gases and particulates.

The 1/100ths of 1 percent is the potential risk level of modern incinerators, O'Sullivan stressed.

"Since there is no such thing as zero risk in the real world, there can be no such thing as an absolutely safe anything, whether you're in a car, plane or walking across the street," O'Sullivan explained.

The state, the Port Authority and the plastics industry all agree that today's technology can convert garbage into energy with the least risk to society.

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The DEP has retained three out-of-state consulting firms, considered the best in their fields, for setting the operating standards for incinerators in New Jersey.

As a result, the state has the most stringent air quality standards in the nation.

The three consulting firms developing the toughest incineration standards in the U.S. are: Karch & Associates, health specialists based in Washington, D.C.; Beaumont Environmental, Inc., Long Island, experts on air pollution control devices, and Battelle Columbus Laboratories, Ohio, combustion engineers.

O'Sullivan's position on PVCs is that "the packaging industry can change to a different plastic without chlorine in them."

The new generation of incinerators is considered the safest yet developed because they are scientifically controlled by the "three T's and big O"—temperature, time, turbulence and oxygen.

"By regulating those elements, an incinerator can operate at peak efficiency around-the-clock," O'Sullivan said. Turbulence involves the proper mix of garbage with oxygen.

The Essex/Newark incineration project, coupled with mandatory recycling, has been endorsed by the regional Lung Association and Sierra Club, as well as the Physicians for Social Responsibility headed by Dr. Walter Burnstein, a practicing physician from Denville.

Even removing PVCs from the refuse will not entirely get rid of the chlorine problem, the plastic industries technical adviser pointed out.

"Most food we eat comes with sodium chloride," Lawrence said. "Common table salt is sodium chloride. It's one of those chemicals that gets around. Some of it can be controlled. Getting rid of all of it before incineration is not possible."

The most important step towards eliminating dioxin is "complete combustion," Lawrence said, referring to a public health study done for the New York City Department of Sanitation.

New York City is planning to spend $3 billion to build eight incinerators to convert its mountain of daily trash to heat and electricity.

A typical incinerator (2,000 tons per day) can generate enough electricity to meet the daily demands of 40,000 homes.