

C-88

THE WASTE CRISIS
DISPOSAL WITHOUT AIR POLLUTION

BEING A SUMMARY OF TESTIMONY
PRESENTED AT THE PUBLIC HEARING
SPONSORED BY THE
NEW JERSEY CLEAN AIR COUNCIL
APRIL 18, 1988

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION

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Rutgers Labor and Education Building
New Brunswick, New Jersey

Scope

There is little doubt that New Jersey is in the midst of a waste disposal crisis. To obtain information on the air quality effects of various waste disposal options, the New Jersey Clean Air Council* held a public hearing on resource recovery and hazardous waste incineration on the campus of Rutgers University in New Brunswick, April 18, 1988. The scope of this public hearing and the selection of panelists were guided by the following general questions:

How do the various waste disposal options affect New Jersey's ambient air quality? What mix of options provides the best plan for handling New Jersey's waste with minimal impact on air quality?

What controls are needed to ensure the reduction or elimination of air emissions? How can current controls and regulations be improved?

How should the cost of waste disposal be apportioned? What role should the N.J. Board of Public Utilities play to ensure that environmentally sensitive disposal operations receive competitive returns for capital invested?

What waste reduction practises are in place in both private and public sectors? How can private successes be used to improve public waste disposal?

* The Clean Air Council is formed under the authority of the New Jersey Clean Air Act; its members are appointed by the governor; its business is to study and make recommendations to the Department of Environmental Protection concerning the implementation of federal and state legislation and regulation dealing with air quality and to advise the commissioner of DEP on air matters.

What is needed to ensure effective operation and maintenance of emissions controls at disposal facilities?

Although the Clean Air Council did not, in its opinion, receive adequate information in all of these areas, the council did draw some conclusions from the discussions and materials generated by this public hearing. These conclusions form the basis of the council's specific recommendations for waste disposal policy in New Jersey. In addition, the council is appending to this summary of testimony, abstracts or summaries of several relevant papers presented at the Spring National Meeting of the American Institute of Chemical Engineers, March 1988, in New Orleans. (Copies of these papers are available from the Council staff.)

DEP's current policy relies heavily on the use of incinerators; therefore the number of incinerators in New Jersey will increase significantly in the near future.

Of the four major disposal options (waste reduction, recycling, incineration, and landfilling), incineration represents the disposal method with the greatest potential for increasing the human health risk from air pollution.

Safe operation and proper maintenance of incinerators require both well trained and responsible operators, stringent air pollution standards, and use of state-of-the-art pollution control devices.

These conclusions form the basis of the council's recommendations to the commissioner for future waste disposal policy in New Jersey.

Recommendations for Waste Disposal Policy

- Waste volume should be reduced through recycling, waste reduction, and recovery processes to the maximum extent that is economically reasonable before waste is incinerated. Funding for recycling and waste reduction programs should be increased so that the level of support matches the importance of these programs in overall waste disposal planning. The Council would like to highlight the crucial importance of public education in encouraging recycling.
- A regional study of the cumulative impact of all present and proposed waste incinerators (solid waste, hazardous waste, sewage sludge) on air quality should begin immediately. If the results of this study show that more stringent standards are required or that fewer incinerators are needed, then appropriate revisions in the state's planning waste disposal strategy should be made.
- Incinerator emissions standards should be as stringent and uncompromising as available techniques allow. Standards should be applied impartially to both private and public sources.
- Batteries, chlorinated materials, and other waste products that produce toxic emissions when burned should be removed from the waste stream before incineration. The use of nontoxic substitutes for common toxic products and participation in household hazardous waste collection should be encouraged through increased funding and public education.
- All incineration facilities should be operated by highly trained personnel. Training programs and criteria for measuring the performance of these personnel should take into account current understanding of human behavior and the man/machine interface. Operating equipment for incinerators should be designed to reduce opportunities for accidents caused by human error.
- To improve the level of public confidence in the proper operation and monitoring of incinerators, DEP should establish procedures to ensure accountability and rapid response to local concerns regarding operation and maintenance. All air monitoring records for operating incinerators should be routinely available to local officials. Local officials should have the power to enforce air emission standards if higher levels of government fail to act.

Where warranted, the local enforcement power and the specific conditions for its exercise could be made a condition of the operating permit.

- Any new state mandates for local enforcement of incinerator regulations should be accompanied by state funding for additional personnel. Any federal delegation to the state should be correspondingly funded.

Background

The basis for New Jersey's solid waste disposal policy is the Solid Waste Management Act of 1970 and its 1975 amendments. This, the first statewide legislation directed solely towards management of solid waste, gives the responsibility for planning and implementing disposal technologies, including site selection and financing, to 22 solid waste management districts (the 21 counties and the Hackensack Meadowlands). In its role of overseer and regulator, the state has recommended a strategy that combines (1) 25 percent recycling of the municipal waste stream by 1989, (2) maximized use of high-technology resource recovery, and (3) residual and by-pass landfilling at "state-of-the art" landfills.

Over the past few years, many of New Jersey's more than 400 landfills, which have been recognized as environmental hazards, have been closed. Of the few remaining landfills, 60 are either small, municipal sites open for disposal of waste from one community only or so-called sole source commercial facilities that take waste from one company only. Up until the end of 1986, 10 to 11 large regional landfills received nearly 90 percent of the state's garbage. During 1987 and 1988, however, 6 of these, accounting for 71 percent of the state's garbage, were closed, including the Edgeboro Landfill, which alone received nearly a quarter of the state's garbage. To make up an annual shortfall of 25 to 30 million tons, the solid waste from northern New Jersey and Camden is now exported out of state at almost double the cost of in-state disposal. (As of April 1988, tipping fees ranged from \$65 to \$135 per ton at transfer stations versus \$22 to \$73 per ton at in-state landfills.)

The majority of New Jersey's counties have selected and formally included sites for new landfills and resource recovery facilities in their state-required Solid Waste Management Plans. More than half the counties have actually begun the review, permitting, and construction process for new incinerators. The state's first new resource recovery facility started operations in Warren County (400 tons per day) during the summer of 1988. Two more are under construction (Essex and Gloucester counties), and 9 more are being reviewed for permits by the Department of Environmental Protection. If all of these incinerators come on line as proposed in the early 1990s, New Jersey will have the capacity to burn approximately 15,000 tons of garbage per day.

Meanwhile, controversies over disposal options are far from over, and counties such as Sussex and Ocean have begun to rethink their plans. These two counties, for example, have rewritten their plans, eliminating incineration and maximizing recycling. Other counties are still trying to

achieve a politically acceptable solution. Debate over the pros and cons of various disposal technologies and the mix of options as well as the feasibility of various waste reduction and recycling methodologies continues to rage both in government chambers and the halls of academe.

Hazardous waste disposal is in a similar state of crisis. Each year New Jersey produces approximately 9 million tons of hazardous waste. A significant portion of this waste is exported to out-of-state disposal facilities. As with solid waste, however, DEP views export only as an interim solution: the cost of export is high and other states are becoming less and less willing

facilities on so-called brown fields, i.e. already contaminated urban or industrial sites. (As of September 1988 this legislation was still pending.)

The 1981 Hazardous Waste Facilities Plan also sets forth a so-called management hierarchy to be implemented as the regulatory framework can be changed. In order of preference, this hierarchy calls for (1) source reduction of waste, (2) recycling, (3) recovery, (4) treatment and incineration, and (5) secure disposal.

Summaries of Testimony

Overview

(1) Richard T. Dewling, Commissioner of the New Jersey Department of Environmental Protection (presented by Don Deieso, Assistant Commissioner)

Solid waste production in N.J. is reaching record proportions. Each year New Jersey produces 10 million tons of solid waste and 9 million tons of hazardous waste, twice the amount of waste produced by our parents. Throughout America there is a direct relation between this increase in the size of our waste stream and improvements in the quality of our material lives. All sorts of packaging make our lives better and easier, while chemicals such as fertilizers, pharmaceuticals, synthetic fibers, and antibiotics make our lives healthier and longer. The state's waste policy emphasizes waste minimization and environmental controls on waste disposal technologies and thus balances the needs of consumers with the public's interest in a clean environment.

What is the current situation? Today 52 percent of the state's solid waste is exported to Pennsylvania, Ohio, Virginia, and New York for disposal, at a cost of \$300 million annually. Hazardous waste is also exported--to Ohio and Alabama. This means we are exporting not only our environmental problems (which is not quite fair), but also ever increasing numbers of local tax dollars that might be better spent at home. Pennsylvania, NY, and Ohio will probably pass laws within the next three or four years to forbid disposal of waste from out-of-state sources. These are the reasons why New Jersey is requiring self-sufficiency in solid waste disposal by 1992. At the same time Superfund Amendments of 1986 require states to be self-sufficient for hazardous waste disposal or lose federal dollars for cleanups of superfund sites.

The greatest obstacle to self-sufficiency in both cases has been the difficulty in siting disposal facilities. There are several reasons for this difficulty. New Jersey's residents are well informed about the environment and are quick to see the dangers of technologies, but this perception of danger can lead to an emotionalism that prevents clear understanding of facts and issues. In addition, some elected officials have not acted responsibly: when they stop the siting process, they are responding to voters' anger and fear and not to the facts. Finally, siting has been difficult because many professionals--engineers, academics, scientists--have been content to observe the siting process rather than participate in it. Yet these

are the voices that carry weight in the public forum. They must be encouraged.

New Jersey's requirements for resource recovery facilities are among the toughest in the world. We require state-of-the-art technologies to be used for waste disposal. The state's standard of 0.015 grain per cubic foot of air for particulate emissions from these facilities is an order of magnitude more stringent than any particulate standard imposed on other new sources anywhere in our country. New Jersey also regulates organic and heavy metal emissions, as well as dioxins (which are also produced by forest fires, automobile engines, and wood burning stoves).

In spite of the many siting difficulties, resource recovery plants are being planned and built. Warren County's 400 ton per day facility will be in full operation by September 1988. Essex County has broken ground for a 2250 ton per day facility; so has Gloucester for a 575 ton per day plant. Permits have been issued for Camden (1050 tons per day) and Bergen County (3000 tons per day). In addition, six or seven more counties are in various stages of planning. This represents a total capital investment of \$4 billion.

The state currently requires that 25 percent of the waste stream be recycled. At best technology can offer about 50 percent of the waste stream--by the year 2000. The state does take recycling into account when determining the size of a resource recovery facility. For example, Bergen County actually produces 3800 tons of waste per day today. Their resource recovery facility will burn 3000 tons per day. The rest must be recycled. Additional future waste generated by population growth will also have to be recycled or taken care of by waste reduction, a concept that DEP endorses--particularly packaging reductions. Plastic recycling is being developed, but it is complicated by the many varieties of plastic. In addition, there has been movement towards placing a surcharge on nonrecyclable cans and bottles.

Compared with landfills, incineration offers rapid reduction of the waste volume, with an acceptable air pollution risk. Landfills leave a legacy of waste and pollution for future generations. There is no disposal method that is entirely risk-free.

Permit requirements

(2) Jorge Berkowitz, Director of the Division of Environmental Quality (DEQ), N.J. Department of Environmental Protection

DEQ issues air pollution control permits and certificates to construct and operate municipal solid waste incinerators. We ensure compliance with both state requirements and the federally delegated prevention of significant deterioration (PSD) program under the Clean Air Act. Air pollution

permits require use of the best available control technology (BACT) and compliance with all applicable emission design and operating standards; they allow neither exceedance of primary or secondary ambient air quality standards nor an incremental lowering of air quality. We use mathematical modelling to calculate both ground level and ambient pollutant concentrations. We evaluate the worst case of ground level pollution by known or suspected carcinogens and allow a maximum risk for resource recovery facilities of four deaths in one hundred million. (This may be compared with a daily risk for just waking up of one in ten thousand and a lifetime natural risk of one in a hundred.)

We require semi-dry scrubbers, fabric filters, or electrostatic precipitators, and auxiliary burners. These burners maintain combustion temperature above 1500 degrees Fahrenheit, ensuring efficient combustion of toxic and other substances including dioxins. During combustion, dioxin molecules are broken into carbon dioxide, water, and hydrogen chloride. The semi-dry scrubbers trap 90 percent of the hydrogen chloride and 80 percent of the sulfur dioxide emissions. The filters and precipitators trap 99.9 percent of the particulate matter. Particulates carry most of the heavy metal molecules.

The five facilities to which DEP has given permits have mass emission limits for 17 pollutants (particulates, sulfur dioxide, hydrogen chloride, carbon monoxide, nitrogen oxides, sulfuric acid, lead, mercury, beryllium, arsenic, cadmium, chromium, nickel, non-methane hydrocarbon, total fluorides, polycyclic aromatic hydrocarbons, and 2,3,7,8-tetrachlorodibenzodioxin). These limits will be enforced by stack testing. Seven continuous monitors and recorders will be used at each unit to enforce concentration limits for carbon monoxide, nitrogen oxides, sulfur dioxide, and opacity and also operating requirements such as furnace temperature and flue gas oxygen concentration. There are reporting requirements and requirements for shutting down an incinerator when air pollution controls malfunction, when certain pollution limits are exceeded, or when operating requirements (for example minimum burn temperature) are not met. Data is telemetered continuously to DEP offices and on-site plant inspections and surveillance will be done. Landfill space will be held for use when an incinerator is shut down. Permits also take into account the issues of traffic flow, noise, and litter, all of which can be of annoyance to a community.

Oversight and enforcement of permit conditions is an urgent need. We are currently setting up procedures for an inspection and audit program to ensure that data is reliable and accurate. Training and certification of facility operators is also a concern and DEP has a task force working on this. The program will be ready to implement by December 1988.

DEQ also reviews part B applications for all hazardous waste incinerators to ensure compliance with the requirements of the federal

Resource, Conservation, and Recovery Act (RCRA). A trial burn ensures compliance. We intend to complete trial burns on all operating hazardous waste incinerators, hold all necessary public hearings, and issue or deny final permits by November 8, 1989. We are working with the Hazardous Waste Siting Commission on a preliminary proposal to construct a 35,000 ton per year hazardous waste incinerator. Discussions involve, equipment design, latest control technology, modelling, risk assessment, environmental and health impact statements.

In our view, all disposal options carry environmental risks and the potential of creating new problems if they are not designed with foresight and care. A variety of waste management techniques must be used to solve the waste crisis. There is no one simple choice.

Ways to improve waste disposal techniques

(3) Alan I. Mytelka, Director and Chief Engineer, Interstate Sanitation Commission

The Interstate Sanitation Commission (ISC) is set up under a compact approved by Congress; it covers New York, New Jersey, and Connecticut, and receives funds from these states. The commission looks at water and air pollution from a regional perspective. We set standards for water pollution and enforce them. We do not set standards for air quality, but we do monitor air pollution and maintain a 24-hour complaint response service.

The ISC advocates recycling and waste reduction to the maximum extent possible. We do not see that appreciable source reduction has yet taken place. We believe certain uses of certain materials that are not a necessity or that can produce toxics during processing should be banned completely--for example, many of the uses of sheet and film plastics and styrofoam. Surcharges and small fines will not work. Many of these products are merely aesthetic packaging; they either take up space in a landfill or exacerbate toxic production during incineration.

To improve recycling efforts, garbage haulers must refuse to pick up garbage mixed with recyclables. Health departments should then levy fines against residents for not having their garbage picked up. Neither recycling nor waste reduction, however, can completely eliminate the need for other disposal methods. Of these other options, the ISC supports incineration as the major method of choice--with certain provisos.

- There should be stringent and uncompromising emission standards--standards that are as stringent as new techniques allow, and standards that are applied impartially to both private industry and to locally or regionally operated facilities.

- Incinerator ash, which may contain high concentrations of such toxics as lead and cadmium, should be placed in a secure landfill for hazardous waste where leachate is treated prior to discharge. This landfill could be centralized. Although there probably isn't a good natural location in New Jersey, one could probably be engineered. If the city of New York can find a location, so can New Jersey.

- A regional cumulative impact study of the potential air quality when all present and proposed waste disposal facilities (solid waste, hazardous waste, sewage sludge, and power plants) are in operation should be done to establish acceptable parameters for air pollutants. The ISC would undertake a study, if the commission had sufficient funding.

- Sewage sludge should be pretreated and then burned. Sludge often contains high concentrations of toxics and heavy metals. It would help if certain products used at home would be banned. Although ISC has in the past recommended combustion of pre-treated sludge as the best and most environmentally sensitive option, ocean dumping is still the "preferred"--read "least expensive"--method of disposal. This is true even though the sludge must be dumped 106 miles off-shore. I would like to see an end to ocean dumping; the commission as a whole is discussing this issue. New Jersey will end ocean sludge dumping in the early 1990s; New York's policy is uncertain. When this occurs, the region will need five or six small sludge incinerators to take care of a total of about 2000 tons of sludge per day or roughly the amount of waste handled by one more resource recovery facility. Composting of adequately pretreated sludge may be a viable option to incineration.

There are legitimate fears that must be allayed and real questions that must be answered about incineration. The time to address these is during planning. There is no single system that will cover everything.

(4) Rita M. McGlone, advocacy director, Delaware Valley Citizens' Council for Clean Air

Incineration should be the disposal option of last resort. Waste reduction and recycling should be given top priority; they provide long-term, environmentally sound solutions to the waste disposal crisis. It is better to prevent the creation of pollution in the first place than to struggle to control it after it is produced.

Incinerators are known sources of a variety of hazardous pollutants. People are exposed through inhalation, skin absorption, and consumption of contaminated food and water. While the threat of these pollutants may not be immediate, we are very concerned for the long term, say 20 to 30 years.

Particulates are very small particles of solid or liquid matter that result from incomplete combustion. They cause reduced visibility, eye

irritation, and respiratory problems. Heavy metals and dioxins attach to particulates and are thus inhaled. The very small particulates (those under 2 microns in diameter) pose the greatest health risk; they are inhaled deep into the lungs and are cleared slowly. N.J. does not limit emission of particulates under 2 microns, nor is there any effective way to control for these emissions.

Incinerators emit both sulfur dioxide, hydrogen chloride, and nitrogen oxides. These emissions form acids upon contact with atmospheric moisture. Acid gases corrode materials and damage plant and tree foliage. Nitrogen oxides and hydrochloric acid contribute to formation of ozone [see report of the 1987 N.J. Clean Air Council public hearing on ozone in the lower atmosphere]. Sulfur dioxide impairs breathing and irritates eyes, throat, and lungs.

Incinerator emissions contain chromium, copper, lead, cadmium, arsenic, nickel, beryllium, mercury, and other toxic metals with known adverse health effects. Dioxins and furans are a major concern to New Jersey citizens. Most studies of health effects have come from industrial accidents. The Center for the Biology of Natural Systems reports that the greatest health risk from dioxin is from food consumption, not inhalation. The dioxin found in one quart of cow's milk is equivalent to breathing the air at the spot the cow is grazing for about 8 months.

The fly ash from incinerators is more hazardous than the bottom ash. "Fly ash" refers to the material collected by pollution control devices; "bottom ash" is the unburned grit left at the bottom of the incinerator. Fly ash represents about 10 percent of the total burn residue. EPA considers fly ash to be a hazardous waste. Tests on 20 municipal burners by the Environmental Defense Fund found hazardous levels of cadmium and lead in all samples of fly ash. Although fly ash and bottom ash are routinely mixed to dilute the hazardous concentrations of toxins in ash, this technique does not make the hazards disappear. Ash is frequently stored on site without effective controls and transported in open trucks along public highways.

Household waste is the largest, single, unregulated source of hazardous material in the municipal waste stream. These materials produce toxic emissions when burned. Mass burning without prior separation will turn this waste into air pollution. Consumers must be educated to recycle this material or to replace it with nonhazardous alternatives. The state must plan for regular collection of household hazardous material.

We need more research concerning interaction (synergism) among the various pollutants emitted from all sources including incinerators as well research to determine the cumulative effect of all planned incinerators, many of which are being sited in close proximity to one another.

Citizens perceive that enforcement of pollution laws can be a problem. Even well designed incinerators will pollute if standards are not enforced,

and we in the community have experienced the poor track record of the Department of Environmental Protection.

The most effective way to control air pollution caused by incineration is to reduce the amount of waste that will be burned through intensive waste reduction and recycling programs. The potential for reduction is great. More than 34 percent of municipal waste is packaging--which costs one out of every eleven food dollars. Rhode Island is proposing legislation to require product labels that inform consumers about durability, reusability, and recyclability. New York is proposing a surcharge on excessive or nonrecyclable packaging. A pilot project involving 100 volunteer households in East Hampton, Long Island, conducted by the Center for the Biology of Natural Systems (Dr. Barry Commoner's group), recovered 80 percent by weight of the waste stream for recycling. Food garbage was composted with yard waste, sewage sludge, and wood chips (32.9 percent); paper (40.5 percent) and mixed cans and bottles (13.4 percent) were recycled. A survey in Buffalo by CBNS found that 78 percent of the households would be willing to participate in this kind of intensive recycling; ironically only a third of these same people thought their neighbors would. There is a major contradiction between the public perception of recycling's potential and what people are actually willing to do if faced with a choice.

This Clean Air Council believes that incinerators must be sized and operated to ensure incentives for continued expansion of waste reduction and recycling programs and protection of the public health. Long-term contracts for guaranteed waste streams do not provide an incentive to increase recycling; in fact they are a disincentive. Incinerators should be used only after full implementation of waste reduction programs.

When incinerators are being designed, ISC recommends some improvements to DEP's Best Available Technology Guidelines: (1) incinerator operators must establish a mechanism to collect or separate household hazardous waste; (2) N.J. must adopt a fine particulate standard similar to California's 0.008 grain per cubic foot of air; (3) hydrochloric acid and sulfur dioxide emissions should be reduced from the current 50 parts per million standard to 30 parts per million; (4) the carbon monoxide standard should be lowered from a 400 parts per million hourly average to a 100 parts per million daily average, like Pennsylvania's standard; (5) ash handling and disposal guidelines should require separation of fly and bottom ash, disposal of all fly ash in a hazardous landfill, frequent and thorough testing of all ash, and strict handling and transportation procedures; and (6) the best available technology requirement should be upgraded to ensure that the best, most stringent emission control equipment is always selected.

Meaningful citizen participation in solid waste planning and implementation is needed, including government outreach programs to educate the public and solicit participation, funding by both government and

vendors so that citizens can hire their own consultants to conduct environmental impact reviews, and community participation during decision-making and standard setting for individual incinerators. Training courses, access to information about operating performance, local enforcement options--including stop-orders, and community compensation for risk--would improve the acceptability of incinerators to the public.

Hazardous waste incinerator permits

(5) John J. Trela, Director, Division of Hazardous Waste Management, N.J. Department of Environmental Protection

The permit process for hazardous waste incinerators is slightly different from the normal air permit process. The permit application includes a Part A (name of applicant and description of activities conducted at the facility), a Part B (a detailed, technical version of Part A), and a Disclosure Statement or Alternative Information Statement (background information on individual owners, the business, and any relevant past problems involving compliance with environmental regulations or criminal activity), trial burn (99.99 percent destruction or removal of identified principal organic hazardous materials is required), and an Environmental Health and Impact Statement. It takes a minimum of two years to complete the application process; however, the average is three to four years. Background checks on existing operators of hazardous and solid waste disposal and transportation facilities are backlogged; these are being done by the Department of Law and Public Safety and the State Police.

There is currently only one commercial hazardous waste facility operating in N.J. -- Rollins in Logan Township. BASF, Ortho Diagnostics, Union Carbide, Dupont, Earle Naval Weapons Station, and ICI Americas operate on a non-commercial basis (for their own use only). These facilities must have final federal permits by November 1989 or they must close. As far as I know, they are all on schedule.

The 1986 Superfund law requires every state to show by October 1989 that they have can handle all hazardous waste generated in state for the next 20 years. If they cannot do this, states are threatened with the loss of Superfund cleanup money. Last year New Jersey received \$248 million from Superfund--one-third of the national total.

The New Jersey Hazardous Waste Facility Siting Commission adopted a siting plan in March 1985. According to this plan N.J. disposes of 22,000 tons of hazardous waste in state per year; this, however, represents a shortfall of between 25,000 tons per year and 109,000 tons per year of actual waste generated (depending on the model used to calculate the numbers). As land disposal options are removed and requirements for

disposal become more strict, we move towards the larger shortfall. New Jersey currently needs additional disposal capacity to incinerate 50,000 to 75,000 tons of hazardous waste per year. The commission is in the process of looking for a suitable location for a new hazardous waste disposal facility.

DEP is assembling a report on household hazardous waste. The legislature is debating new public policy on hazardous waste minimization. Burning at sea is regulated by the federal government, but it is currently "on hold." Several businesses have developed mobile hazardous waste incinerators--so called fire dragons-- for use at clean-up sites, particularly Superfund sites. These are at the moment being used only as demonstration projects on a national basis.

Small incinerator standards

(6) Bill O'Sullivan, Assistant Director, Division of Environmental Quality, N.J. Department of Environmental Protection

DEP is reevaluating its requirements for incinerators that burn under 10 tons of waste per day. For example, continuous monitoring of carbon monoxide emissions and temperature are now required, and small incinerators must be operated by a licensed technicians. Although advanced pollution control equipment is not required, these new requirements will make small incinerators more expensive to operate and, as a result, we expect to see fewer and fewer of them. Hospitals and some industries may continue to burn small amounts of waste on site, but apartment house incinerators will probably disappear. There are currently about 200 of these small burners operating in New Jersey. All have permits, although some of the permits are very old.

Enforcement

(7) Thomas Vaughn Fitzgerald, Ridgewood, New Jersey

Standards to limit air pollution are useless unless they are enforced even-handedly on both private and public sectors. When one government agency fails to enforce its standards on another government agency, public trust in government's ability to control large public garbage incinerators is destroyed. My own experience trying to get the state to enforce its law against the idling of heavy diesel equipment (NJAC 7:27-14.3) on the Ridgewood public works department habit of letting their garbage trucks idle illustrates my point. For 19 months I have tried every path, but the diesels are still running, unattended, and against the law. This is not an

earth-shattering situation of course, but before we start worrying about polluting the air with fumes from state-of-the-art incinerators that won't become a reality for years to come, let's clean up our act and demonstrate that the standards apply to everyone

Funding, public education, and enforcement

(8) William M. Sieben, Environmental Officer, Borough of South Plainfield

I am here to ask that any new state and federal mandates requiring local enforcement be accompanied by funding for additional personnel. Local budgets are very tight. Communities are having difficulties meeting ever increasing demands placed on them by higher levels of government. Our local, state-mandated recycling program, for example, is currently operating on a deficit basis. It is interesting that the state's incinerator program, on the other hand, receives billions of dollars of support.

I would also like to emphasize the importance of local public education to get local acceptance of resource recovery plants. From an environmental scientist's point of view, I believe resource recovery to be a necessity, but there are many misconceptions.

South Plainfield works with both DEP and Middlesex County on enforcement of air pollution regulations. Some areas of DEP give a better response than others. For example, I find it easier to work with the regional water pollution control office than with the state hazardous waste division. It all depends on the individuals involved. I have had some great cooperation from DEP too.

(9) Terry McAdams, Chief of the Bureau of Resource Recovery, Division of Solid Waste Management, N.J. Department of Environmental Protection

DEP recently formed a task force of professional engineers, academics, and government representatives whose goal is to develop ways to assess and measure the performance of operating personnel in resource recovery facilities. The task force will develop criteria for training and certification of personnel.

Guidelines for incinerators

(10) Jane Tousman, Edison, New Jersey

While I am pleased to hear about new efforts to train and certify the personnel who will operate resource recovery facilities and about additions to the list of regulated pollutants, I remain concerned that standards for resource recovery plants are merely guidelines, not the law. Although guidelines grant flexibility in permitting, they also mean inconsistency of standards and perhaps difficulty with enforcement.

Written testimony

Cost, regional air studies

(11) Madelyn Hoffman, Director of the Grass Roots Environmental Organization

GREO is currently working with about 75 citizens groups in New Jersey; about one-third of them are opposing siting of garbage incinerators; another 6 are fighting hazardous waste incinerators. We recommend that DEP prepare a complete analysis of the total daily air pollution load in the state before siting any new garbage or hazardous waste incinerator, large or small. People do not want promises and assurances, they want facts and action. We want to know about health effects and costs.

For ten years citizens groups have been looking at waste disposal options, and time and time again they have concluded that incineration is the most expensive and most risky of existing alternatives. People agree that society must produce less garbage, conserve resources, and end toxic pollution.

Although people call solid waste incinerators "resource recovery facilities," there is actually a net energy loss associated with burning garbage. The energy produced by burning a piece of newspaper or a piece of plastic is much less than the energy consumed by making it. If that paper or plastic were recycled instead of burned, there would be a net energy gain in the system. Although the state says it is committed to recycling and waste reduction, the state has failed to put its money where it's mouth is.

Numbers, costs, enforcement

(12) Linda Stansfield, Program Consultant for Environmental Affairs, American Lung Association of New Jersey

The points we made at the 1984 public hearing on resource recovery remain valid. There are too many plants in the permit pipeline--this is exactly what we cautioned against four years ago. Instead of slowing down and establishing a documented record that the state can do the job and

enforce strict standards, DEP has hurried ahead at full speed. For example, Camden, Pennsauken, and Gloucester County all have incinerators planned and permitted for the Delaware Valley: it's overkill, irrational, and very expensive. Did DEP take into account all these emissions when permitting individual plants? --no, each was permitted as though the other 2 did not exist. It is commonly stated by DEP personnel that 5 or 6 incinerators would meet New Jersey's needs, yet 12 plants are in some phase of the permit process and 6 to 8 more are planned. This is madness.

According to an article in the Wall Street Journal (June 16, 1988) government agencies across the country are beginning to back away from resource recovery. Incineration represents an enormous capital expense, and cost over-runs are not uncommon. Revenues from electricity sales can fail to meet expectations, and application of European technology to the burning of American garbage (which is a different mix of plastics, aluminum, and glass) can be tricky. EPA has found that much of the ash from incinerators is hazardous by federal definition (contaminated by lead, cadmium, and chromium); the cost of ash disposal in hazardous waste landfills will be very high. Ironically, the better the air pollution equipment, the more hazardous the fly ash. As a result of factors like these, more than \$3 billion in incineration projects have been scrapped during the past 18 months, and 1986 and 1987 orders are running at half the rate of 1985. Los Angeles, San Francisco, San Diego, Seattle, Pompano Beach (Fla), Broward and Collier counties (Fla.), and the state of Washington are among communities turning away from planned incinerators.

In 1987 EPA reported that air pollution presents the greatest risk to public health. This information should have caused a reassessment of N.J.'s solid waste policy. It did not. There is no doubt that incinerators are potential sources of pollution. Although the state says that it places great importance on waste reduction, recycling, and composting--it does not put its money into these options. The dollars spent by the state on reduction should exceed those spent to subsidize incineration. The recycling component of each incinerator should be complete and comprehensive. The dangers of air pollution are not science fiction; the ozone hole and the effects of acid rain and global warming are with us today. Incineration may look like an easy solution, but it is not the best.

Finally, enforcement is going to be a problem. Shutting down facilities that exceed permit requirements will be difficult. Air enforcement in this state is too lenient, too vulnerable to court action, and too undermanned. Increased funding for enforcement and training would be a step in the right direction; it would be even better to keep the number of plants to a minimum.

APPENDIX

Summaries and/or abstracts of papers presented at The American Institute of Chemical Engineers, Spring National Meeting, March 1988, New Orleans, Louisiana

Richard A. Denison, Scientist, Toxic Chemicals Program, Environmental Defense Fund. "The Hazards of Municipal Incinerator Ash and Fundamental Objectives of Ash Management."

"Recent data . . . corroborate earlier indications that municipal solid waste (MSW) incinerator ash is hazardous. These data demonstrate that: (1) ash contains high levels of several highly toxic metals and can also contain dangerous levels of dioxins; (2) certain of the metals--lead and cadmium, in particular--are readily leachable from ash at levels that frequently exceed the limits defining a hazardous waste; (3) incineration concentrates and mobilizes the metals present in MSW and can create dioxins, opening up several new pathways of exposure to these toxins; and (4) ash is toxic when tested by several means in addition to the extraction procedure (EP) toxicity test. Each of these findings is especially evident for the fly ash component of MSW incinerator ash.

"Environmentally sound ash management must therefore aim to reduce the hazardous character of the ash. In the view of the Environmental Defense Fund (EDF), this will require the development of strong incentives and/or regulations to: (1) separately test and manage fly and bottom ash; (2) dispose of ash separately from other wastes in secure facilities; (3) treat ash prior to disposal to reduce both its present and future hazards; and (4) keep toxic metals out of products that find their way into the municipal wastestream and keep materials containing such metals out of incinerators.

"The first three means of reducing the hazards of ash involve management at the back end, that is, after hazardous ash has been generated. While the last objective may appear to be beyond the scope of ash management, steps taken to remove metals from products or MSW prior to incineration are increasingly recognized as the economically and environmentally preferable methods of reducing ash toxicity. Viable long-term solutions to the ash problem will require both stringent regulation of ash management and controls over the use of incineration that maintain opportunities and strong incentives to reduce ash toxicity at the source."

Acid gas scrubbers, which use a slurry or powder of lime to neutralize acid gases, contribute to elevated lead levels in fly ash. This slurry is mixed

with the fly ash during operation. The lime produces an alkaline mixture (pH values of 11-12 or higher) in which certain toxic metals--most notably lead--are highly soluble. Tests of fly ash in U.S. incinerators with acid gas scrubbers do show hazardous lead levels. The increased alkalinity of fly ash from these facilities may also increase leachability of organic chemicals present in ash, possibly including dioxin.

Floyd Hasselriis, P.E., Gershman, Brickner and Bratton, Inc., Falls Church, Virginia. "How Control of Combustion, Emissions, and Ash Residues from Municipal Solid Waste Can Minimize Environmental Risk."

"Designers and operators of municipal waste combustors can achieve minimum environmental risk due to discharges of gaseous emissions to the atmosphere and solid wastes to recovery or landfilling, if they know what parameters need to be controlled, how to control them, and what monitors and measurements are needed to maintain control. . . . New data show that both too much and too little excess oxygen or furnace temperatures cause increases in emissions of trace organics such as dioxins and furans; that oxygen and carbon monoxide are critical measurements for control of combustion and monitoring of effective mixing of reactants; that acid gas scrubbers can condense organic and inorganic vapors which can be collected by fabric filters; and that either too high or too low pH readings cause undesirable increases in soluble heavy metals such as lead and cadmium in ash residues. Careful operation and control make it possible to maintain optimum combustion and minimize organic emissions and soluble heavy metals in the residues."

Theodore G. Brna, U.S. Environmental Protection Agency, Air and Energy Engineering Research Laboratory, Research Triangle Park, N. Carolina. "State-of-the-art Flue Gas Cleaning Technologies for MSW Combustion."

Nearly 2000 solid waste incinerators are operating in Japan and several hundred in Western Europe, with newer facilities being waste-to-energy systems rather than simple incinerators. Approximately 100 incinerators are operating in the United States. Incineration does result in air pollution, and not all of these pollutants are currently regulated by E.P.A., although the agency has announced its intention to promulgate further rules by December 1990. Today's incinerators must have the potential for multi-pollutant control, if costly retrofits and upgrading are to be avoided as new rules are adopted.

"Wet or dry scrubbers are effective for controlling acid gases, trace organics, trace heavy metals, and particulate matter produced by burning municipal solid waste. The choice of scrubber type depends on the pollutants to be controlled and the degree of control required. [Dry scrubbers are simpler to operate than wet processes.] Dry sorbent (lime) injection with an electrostatic precipitator is used extensively in Japan for acid gas control, but wet scrubbing is preferred where heavy metals control is also needed. The electrostatic precipitator/wet scrubber combination appears to be favored in West Germany for plants started up in the past decade and those expected to start up in the next several years. In the U.S., the lime spray absorption/fabric filter system is now frequently being selected for multi-pollutant control.

"Acid gas removals of 90 percent or more have been achieved with a lime circulating fluid bed or lime spray dryer absorber preceding a fabric filter or electrostatic precipitator. Wet scrubbing preceded by an electrostatic precipitator is at least as effective as the systems noted when used to control acid gases. These systems are also effective for controlling organics and trace heavy metals, with mercury control appearing to be improved at lower temperatures and when a fabric filter rather than an electrostatic precipitator is used. Both the precipitator and fabric filter can meet current particulate control requirements, but the fabric filter may have the edge for multi-pollutant control. More data, especially from commercial units under long-term operation are needed to quantify fully the performance of scrubbers designed to remove trace organic compounds and trace heavy metals."

P. Grziwa, Saarberg-Interplan GmbH, and E. Wied, Interpower Technologie GmbH, Saarbruecken, Federal Republic of Germany.
"Municipal Waste Management in West Germany and the Use of Fluidized Bed Combustors."

About 33 million tons of municipal waste (0.53 tons per year per capita) is generated annually in West Germany. Landfill space is declining. Certain components of modern garbage (plastics) make composting a slower process than it used to be. The market for recycled materials has not been well developed. Source separation has just begun. Although air pollution problems have encouraged reluctance to rely more heavily on incineration, improved technologies have changed this picture.

Today most household waste is burned, either at conventional mass-burning plants or so-called refuse-derived fuel plants using fluidized bed combustion systems. Indeed, RDF is receiving increased attention. The separation of certain components of household waste before burning

improves combustion and allows recycling. This separation is done by screening with the light, more or less combustible fraction forming both the major part of the waste and the smallest part of the pollutant constituents of the raw waste. This type of simple "treatment" removes 65 to 80 percent of the potential pollutants before incineration and results in improved combustion, improved economy, and improved environmental control.

David Strobhar, Belville Engineering, Inc., Dayton, Ohio. "Human Factors in Process Plant Safety."

Limiting factors on complicated technical systems are the physical and psychological characteristics of the people who operate them. Many accidents in process plants are attributed to operator error, and most of these to "poor judgment" or "bad operator decision." In actuality, the accidents may really be due to poor human engineering. To reduce accidents, display units, warning systems, and other system features including emergency procedures, must be carefully designed with people in mind and tested by real people to ensure that actual operators can both understand and do the task.

John E. Bayer, Chemical Waste Management, Inc. "Management of Environmental Risks in the Commercial Hazardous Waste Industry."

The risks of hazardous waste management are no greater (and sometimes less) than the risks in many other industries. Employee health and safety procedures, elimination of environmental pathways for pollutants, and compliance with government regulations combine to make environmental risk management effective. Any risk management program must first distinguish between real and perceived risks. Employee safety is ensured through training, accident and fire prevention, and medical surveillance of worker exposure. If employee exposures are kept low, the exposure pathways for communities around the facility will also be well controlled and exposures low. Careful siting of facilities on safe geological formations reduces opportunities for ground and surface water contamination. Air and water monitoring systems ensure safety. Finally, full compliance with all governmental regulations helps not only to reduce risk but also creates a corporate culture of environmental protection.

Takuya Kotani and Katsuhiko Mikawa, Mitsui Engineering and Shipbuilding Co., Ltd. "Combustible Materials Recovery and MSW Fluidized Bed Incineration in Japan."

"In Japan, disposal plans for municipal solid waste (MSW) are determined by the municipalities themselves. The MSW is collected, transported, and disposed of by those municipalities so that the environment is not affected. MSW is normally divided into three types for collection and processing: combustible waste, incombustible waste, and bulky waste. About 120,000 metric tons of MSW are generated every day, 70 percent of which is burned in about 1900 incineration plants.

"To extend the life of the disposal area [landfill], a plant to reduce the amount of incombustibles as well as waste unfit for incineration (which includes many combustible materials) has recently been built in Tokyo. The capacity of this plant is 1,250 metric tons per day, and the incombustibles and waste unfit for incineration are sequentially separated into iron, aggregate, plastic, and other materials (mainly combustible) by shredding and separation.

"[Although] Stoker-type incinerators have been . . . used for the past 20 years to burn MSW, . . . fluidized bed incinerators have advantages . . . [for] treating MSW containing hazardous material and [for] meeting stringent environmental requirements. In Japan, 90 fluidized-bed MSW incineration plants are currently operating or under construction, and the number will increase . . . in the future."

Fluidized-bed incinerators burn both wet and dry waste effectively. They are of simple and sturdy design, so they have long, maintenance free operation. Their combustion rate is 99 percent; low ash residue extends precious landfill space. Because of the compact furnace design and the high heat content of fluidizing material, starting and stopping operation are easy and quick.

N.C. Vasuki, P.E., General Manger, and Pasquale S. Canzano, P.E., Chief Engineer, Delaware Solid Waste Authority, Dover. "State of the Art Materials Recovery Systems: Options and Economics"

In 1983 New Castle County Delaware (pop. 420,000) completed the Delaware Reclamation Plant for processing of 500,000 tons of solid waste and 60,000 tons of sludge annually. Half the solid waste is recovered as Refuse Derived Fuel (RDF), which is burned for energy. The rest (noncombustible) is sent for landfilling. Methane gas from the landfill is currently recovered and flared, although methods to use it for fuel are under study. During waste processing, ferrous metals and glass are removed and either recycled or landfilled. Certain nonferrous metals are also removed. Sludge is composted,

screened, dried, sorted, and marketed for agricultural use (mostly poultry litter).

The Delaware experience shows that central processing of waste for materials recovery is both feasible and economic. Operation of the facility is carried by user fees of \$35.26 per ton. Average charge for solid waste collection and disposal service (twice weekly) for New Castle County households is \$186 annually, or \$15.50 per month (70 percent of this cost goes for collection). Moreover, materials recovery before incineration both increases recycled materials and reduced the heavy metal content of ash.

Donald K. Walter, Director, Biofuels and Municipal Waste Technology Division, U.S. Department of Energy; Barbara J. Goodman, Coordinator, Energy from Municipal Waste Program, Solar Energy Research Institute, Golden, Colorado; and Christina E. Thomas, Communicator, Publications Development, Solar Energy Research Institute, Golden, Colorado. "Thermal and Biological Options for Advanced RDF Systems."

Two hundred million tons of municipal solid waste are generated annually in the United States, with an energy potential equivalent to three to four million barrels of oil per year. So far, however, the miscellaneous and ever-changing character of municipal solid waste has presented a formidable barrier to its effectiveness as an energy source. Prior treatment by mechanical screening, sorting, shredding, can enhance fuel combustability, but various incinerator designs are responsible for the relatively poor experience with RDF in the U.S. New and better technologies are being developed and tested, however; these will have to be made more economic for the energy potential of solid waste to be fully realized.

Editorial and writing assistance for this report was provided to the Clean Air Council by Linda Howe.

CURRENT STATUS JUNE 1988

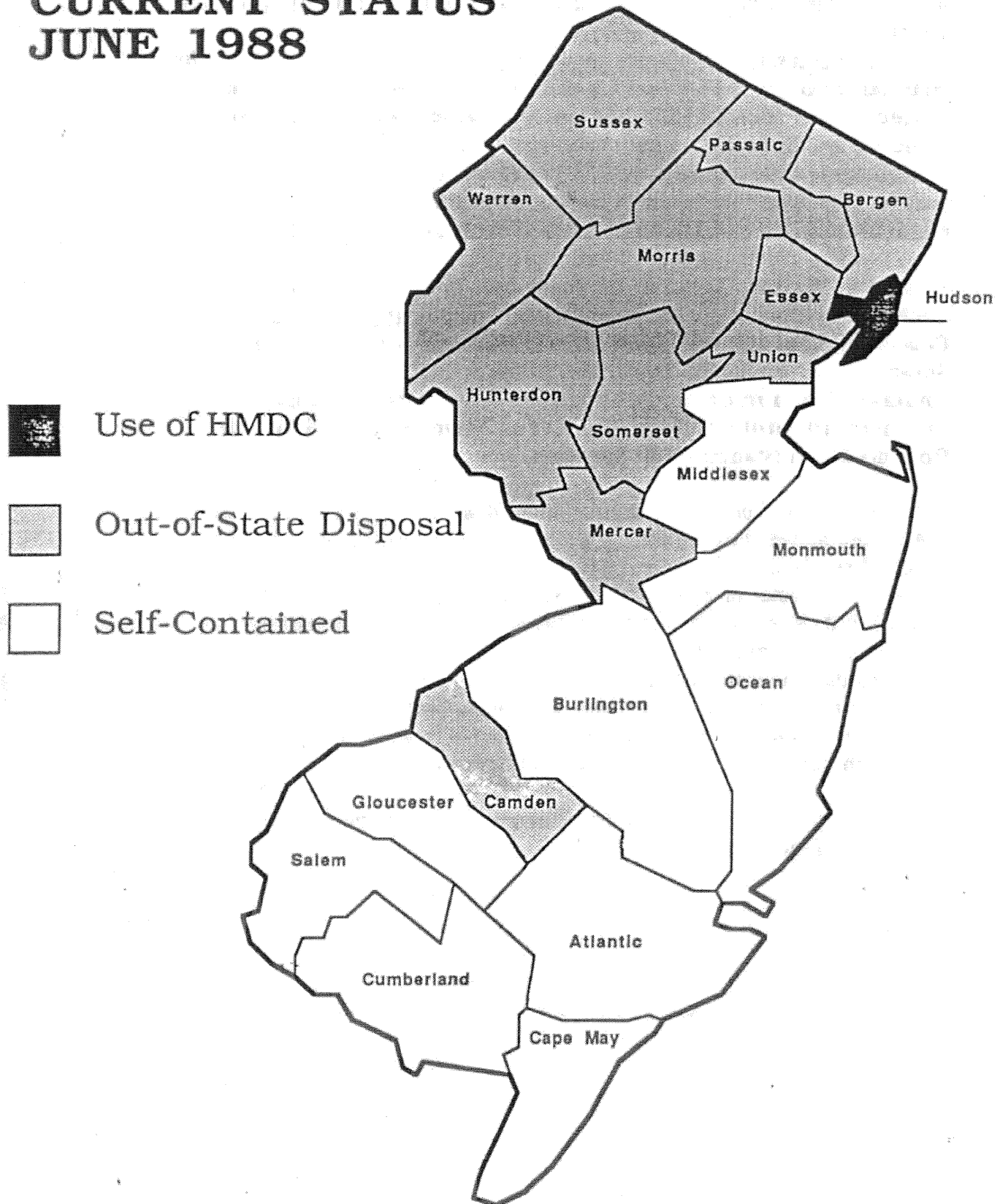


Figure 1

COUNTIES THAT HAVE FORMALLY SELECTED RESOURCE RECOVERY SITES

(As of June, 1988)

1. Lafayette Township
2. City of Passaic
3. Ridgefield Borough
4. Oxford Township
5. Rockaway Township
6. City of Newark
7. Koppers Coke Site
8. City of Rahway
9. Bridgewater Township
10. Sayreville
11. Hamilton Township Site
12. Tinton Falls
13. S.W. Facilities Complex
14. Township of Ocean
15. Pennsauken Township
16. South Camden
17. West Deptford Township
18. Carney's Point Township
19. Egg Harbour Township
20. Woodbine Boro

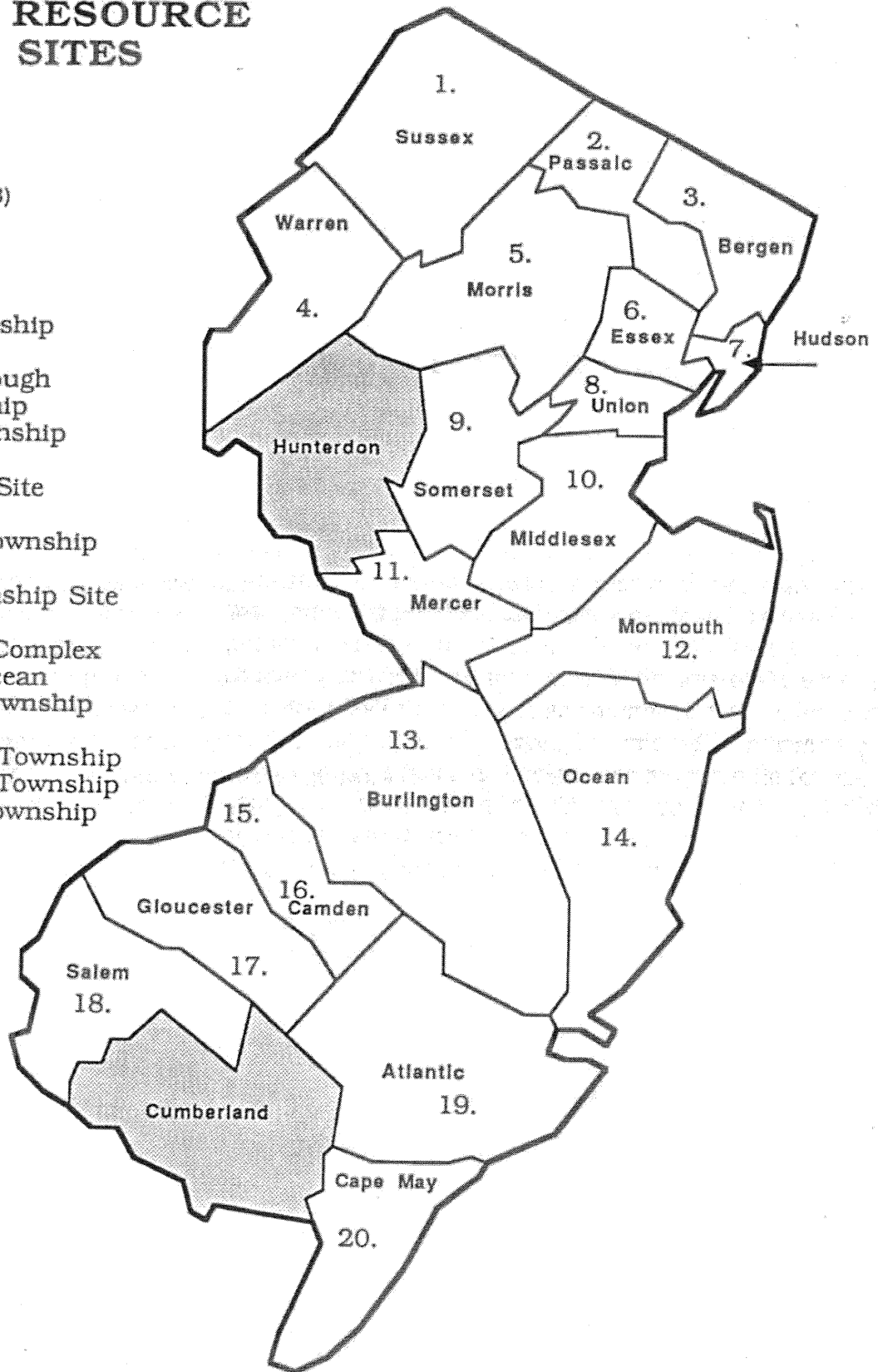


Figure 2

RESOURCE RECOVERY FACILITIES

UNDER PRELIMINARY REVIEW

Cape May County	500 TPD	1991
Mercer County	975 TPD	1991
Ocean County	1500 TPD	1992

UNDER FINAL TECHNICAL REVIEW

Union County	1440 TPD	1991
Passaic County	1300 TPD	1991
Hudson County	1500 TPD	1992

PERMITTED/FINAL DECISION PENDING

Camden County	1050 TPD	1990
Pennsauken	500 TPD	1990
Bergen County	3000 TPD	1991

UNDER CONSTRUCTION

Essex County	2250 TPD	1991
Gloucester County	575 TPD	1990

ENTERING SHAKEDOWN

Warren County	404 TPD	Summer 1988
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OPERATING

Fort Dix	60 TPD	1986
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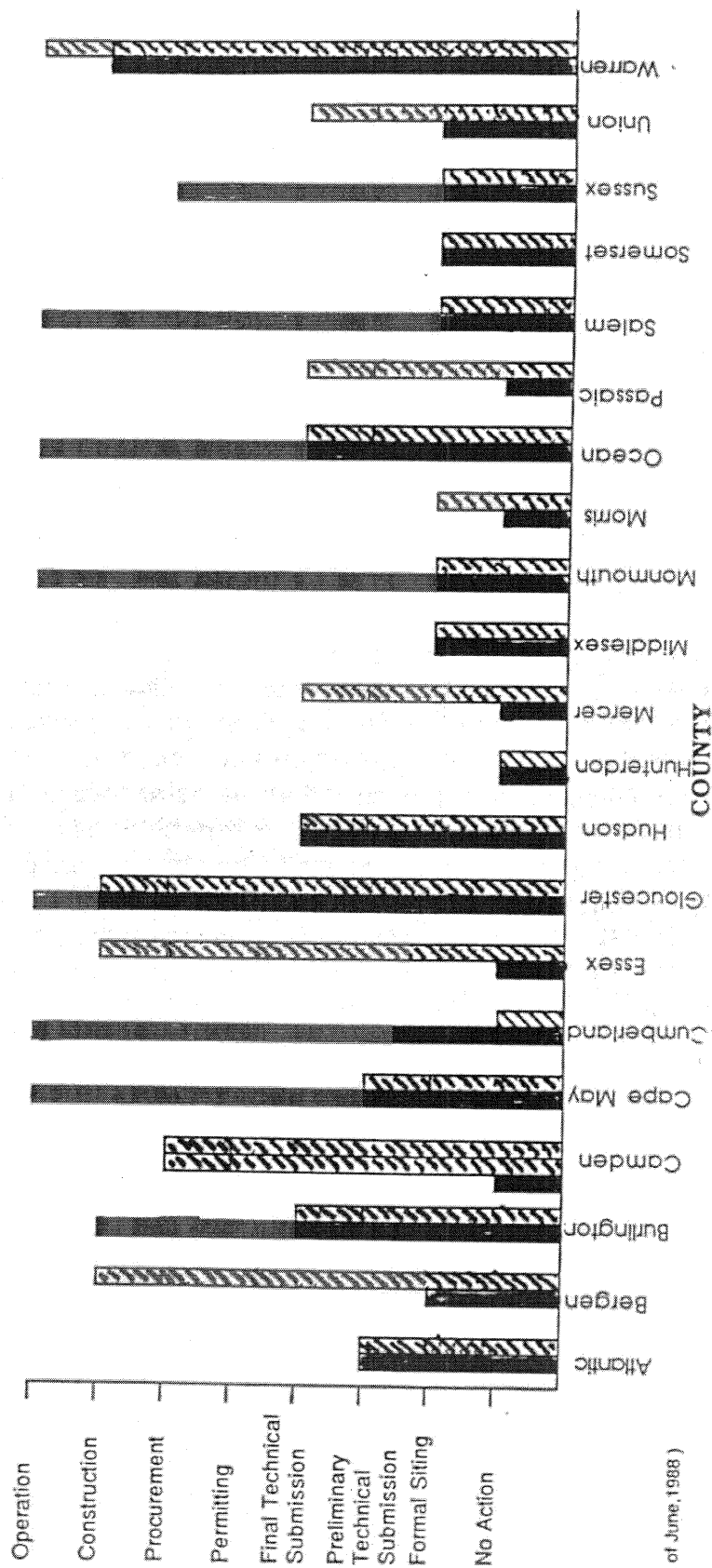
Figure 3

LONG TERM SOLID WASTE FACILITY PROJECT DEVELOPMENT STATUS *(Landfill & Resource Recovery)*

INTERIM / RESIDUAL
LANDFILL

RESOURCE RECOVERY

PROJECT MILESTONE



(As of June, 1988)

Figure 4



NEW JERSEY CLEAN AIR COUNCIL

Department of Environmental Protection

CN 027

Trenton, New Jersey 08625-0027

January 13, 1989

Honorable Christopher J. Daggett
Acting Commissioner
New Jersey Department of Environmental Protection
401 East State Street
Trenton, NJ 08625

SUBJECT: 1988 New Jersey Clean Air Council Public Hearing Report
"The Waste Crisis - Disposal Without Air Pollution"

Dear Commissioner Daggett:

Enclosed please find a report of the 1988 Clean Air Council
Public Hearing.

In addition to the testimony presented at the Public Hearing and
additional written comments submitted to the Council, we were
fortunate to have technical reports from a March, 1988 meeting of
the American Institute of Chemical Engineers. Some papers from
the New Orleans meeting are summarized in the report. There may
be others of which we are not aware or which may be available to
NJDEP upon request from the American Institute of Chemical
Engineers.

While not a part of the Public Hearing Report, the Clean Air
Council recently heard a presentation from Rutgers' Professor
Melvin S. Finstein regarding an alternate method of disposal
useful for sewerage sludge. His presentation focused on process
and developmental considerations. In view of federal
legislation removing sewerage sludge from the ocean, Professor
Finstein's research and operational experience may prove useful
in developing land based sewerage sludge disposal alternatives.

Herb Wortreich, Helen Benedetti, the late Bob Myers, and others
provided the necessary support for the successful conduct of the
Public Hearing by the Clean Air Council.

Christopher J. Daggett

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January 13, 1989

If there are questions regarding the enclosed Public Hearing Report, we would be happy to meet with you at any Clean Air Council meeting or any time convenient for you and your staff.

Very truly yours,

NEW JERSEY CLEAN AIR COUNCIL



John D. Grant, PE
Chairman 1988-90

JDG:jc

Enclosure