Natural Resources Defense Council, Inc.

917 15TH STREET, N.W.
WASHINGTON, D.C. 20005

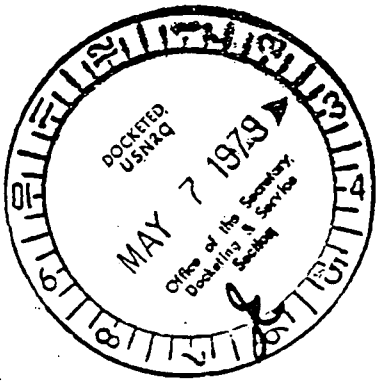
202 737-5000

Western Office
2345 YALE STREET
PALO ALTO, CALIF. 94306
415 327-1080

New York Office
122 EAST 42ND STREET
NEW YORK, N.Y. 10017
212 949-0049

5/3/79

May 3, 1979



Gary L. Milhollin, Esq.
1815 Jefferson Street
Madison, Wisconsin 53711

Mrs. Elizabeth B. Johnson
Union Carbide Corporation
Nuclear Division
P.O. Box X
Oak Ridge, Tennessee 37830

Dr. Quentin J. Stober
Fisheries Research Institute
University of Washington
Seattle, Washington 98195

Re: Commonwealth Edison Co., et al. (Transportation of Spent Fuel Between Dresden Nuclear Station and Quad Cities Nuclear Station), Dkt. Nos. 50-237/249/254/265

Dear Board Members:

In response to the Board's Order Following Special Prehearing Conference, April 19, 1979, enclosed are representative materials prepared by Citizens for a Better Environment and Natural Resources Defense Council to disclose their interest in the issue of nuclear power. These materials have been distributed either to present members or to prospective members or to both.

Sincerely,

Anthony Z. Roisman

enclosures
cc: (w/enc.) service list

The NRDC Professionals . . .

To push authorities toward safe and clean energy sources, NRDC has gathered a staff of top professionals. When you join NRDC, these are some of the people working for you . . .

DR. ARTHUR TAMPLIN: Degrees in Biochemistry and Biophysics from University of California, Research Associate for the Rand Corporation, Lawrence Radiation Laboratory (California), Atomic Energy Commission Division of Biology and Medicine. *NRDC staff scientist since 1973.*

DR. THOMAS COCHRAN: Degrees in physics and engineering from Vanderbilt University, Asst. Prof. of Physics at the US Naval Postgraduate School, Supervisory Researcher at Litton Mellonics Division's Scientific Support Laboratory, Resources for the Future (Researched environmental effects of US civilian nuclear power industry). *NRDC staff scientist since 1973.*

DR. TERRY LASH: Degrees in Molecular Biophysics from Yale University, Postdoctoral Research at Yale Medical School. *NRDC staff scientist since 1972.*

ROGER BEERS: Degree in Law from Harvard, Associate at major law firms in San Francisco and New York. *NRDC staff attorney since 1973.*

ANTHONY ROISMAN: Degrees from Dartmouth College and Harvard Law School, Attorney for U.S. Department of Justice, Partner in Roisman, Kessler and Cashdan. *NRDC staff attorney since 1977.*

JONATHAN LASH: Degrees from Harvard College and Columbus School of Law, Peace Corps volunteer, Assistant U.S. Attorney, *NRDC Senior Project Attorney since March, 1978.*

HELENE LINKER: Degrees from Radcliffe, Stanford and Stanford Law School, Teacher. *NRDC Project Attorney since 1977.*

GEORGIA YUAN: Degrees in Applied Earth Sciences and Geology from Stanford and Oberlin, taught Environmental Geology at San Francisco State University. *Consulting Geologist to NRDC Radioactive Waste Program, 1979.*

How CBE Works

Citizens for a Better Environment was founded in 1971 in Illinois by private citizens concerned with ensuring everyone's right to a healthy environment.

A non-profit, tax exempt organization, CBE has a full time professional staff of environmental scientists and lawyers who protect citizens' rights to a clean environment. Citizens who come to CBE with a pollution complaint have as an ally our experienced, skilled professionals working on the individual's behalf to stop the problem.

CBE also interacts daily with government agencies, reminding them of the public's stake in a clean environment. The staffs of these government agencies are under constant pressure from those who wish to continue polluting. CBE's role as a necessary counter-pressure ensures strict enforcement of pollution laws.

CBE does solid research on important environmental problems and then makes sure that the results are put into the hands of the citizens who can use them. In addition to numerous reports and comments, CBE also publishes its own *Environmental Review* monthly. CBE staff members last year appeared on a number of radio and television programs and gave many lectures at universities and before professional societies.

CBE raises approximately 70% of its budget from the annual canvass conducted in residential neighborhoods with most of the balance coming from foundation grants. This money is well spent, with over 65% going to program activities: research, litigation and public education. The grassroots financial support raised by the annual canvass provides CBE with a stable financial base and keeps the organization independent of pressures from large vested interests.

_____, 1979

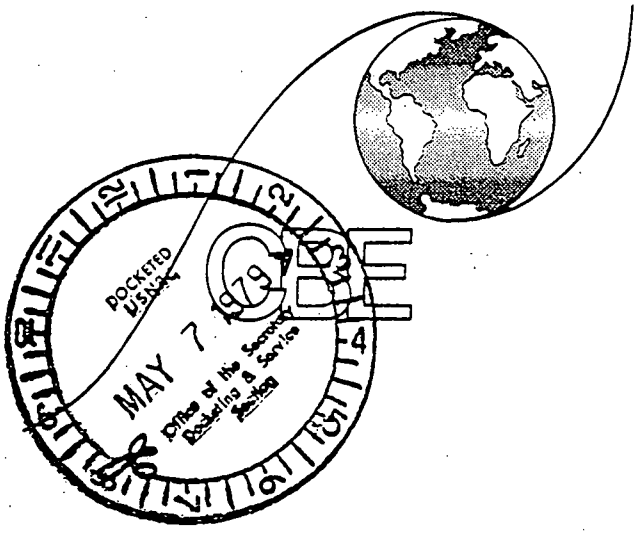
Received of _____

Tax deductible contribution of $ _____

Contribution of $15 or more ($8 for Senior Citizens) entitles donor to membership subscription to 12 issues of the monthly *CBE Environmental Review*.

Received by _____
CBE Representative

Citizens for a Better Environment
59 E. Van Buren, Suite 2610
Chicago, Illinois 60605
(312) 939-1984



citizens for a better environment

CBE's purpose is to protect our air and water, and to defend our right to a healthy environment. To achieve these goals, CBE's program is to pursue as aggressively as possible the curtailment of pollution and the conservation of energy without causing job loss.

". . . each person has a responsibility to contribute to the preservation and enhancement of the environment."

— National Environmental Policy Act

Examples of Research and Litigation

Energy Policy

Nuclear Evacuation Plan Study

A CBE study showing that federal agencies have avoided taking responsibility for nuclear disaster planning prompted President Carter to announce a total reorganization of all federal emergency services.

The CBE report received prominent national media coverage. It focused on those federal, state and local plans devised to protect the public from the accidental release of radioactivity from a nuclear power plant. Few states have federally approved plans, and drills have shown that many tested plans have major flaws. Illinois has one of the worst state evacuation plans in the [redacted] in spite of the fact that there are two nuclear plants within forty miles of Chicago.

Commonwealth Edison Rate Reduction

CBE's intervention at the Illinois Commerce Commission hearing on Commonwealth Edison's request for a $125 million (5.6%) rate increase resulted in the ICC granting the utility only a 3.1% rate hike.

Edison claimed that inflation and regulatory lag caused unacceptably low returns. CBE research indicated that Edison mismanagement of plant construction is the main reason for the utility's low earnings. We showed that Edison's generating capacity is in fact more than twice its stated goal of 14% and added that this figure could rise to 40% in the next decade.

As a result of CBE's work the ICC has ordered a formal investigation into Edison's construction program to determine whether the utility is maintaining more generating capacity than it needs to meet consumer demand.

CBE successfully blocked or reduced all three of Commonwealth Edison's requested rate increases during 1977-1978.

[redacted] Load Forecasting Investigation

This year CBE continued its participation in an ICC proceeding to investigate load forecasting methods used by six major Illinois utilities.

CBE studies have revealed that unnecessary power plants have been built because of utility's exaggerated predictions of electrical demand. CBE advocates peak-load pricing where consumers would be encouraged to shift their demands to periods of low demand. This shift in demand would reduce the need for construction of additional power plants, the main reason for rate increases.

The final decision of the Commission is expected sometime in 1979.

Toxic Substances

Alternative Pest Control Strategies For The Midwest

CBE is researching alternative control measures for pests among Midwestern crops so that the findings can be presented to farmers in the region.

The U.S. currently relies almost exclusively on synthetic chemicals for the control of pests. In the Midwest, thousands of pounds of pesticides are introduced into the environment annually, many of which may have harmful side effects.

CBE advocates the adoption by farmers of mechanical and cultural controls to alleviate their current pest problems, using pesticides "only on an as needed basis."

Premanufacture Notification Under ToSCA

CBE spoke before the U.S. EPA's Toxic Substances Advisory Committee and criticized suggested guidelines that would allow a new chemical to be manufactured before its effects on human health and the environment have been fully assessed.

The EPA is drawing up guidelines for the testing of new chemicals under the Toxic Substances Control Act. CBE maintains the government must know a new chemical's toxicity before it is manufactured and introduced into the environment. This would allow the government and the public to determine the human and environmental health hazards inherent in a new chemical substance before manufacture begins. CBE will attend more meetings this year in an attempt to strengthen the guidelines in an environmentally sound manner.

Sewage Sludge Poses Public Health Threat

A CBE study demonstrated that the use of highly contaminated sewage sludge fertilizers on agricultural land can cause serious health problems.

Crops grown on sludge-treated soil absorb many of the toxins in the sludge such as cadmium and lead. CBE recommended that the U.S. EPA prohibit the use of sludge on agricultural land.

Cadmium, a metal found in high concentrations in Milwaukee and Chicago sludge, has been shown to cause cancer, birth defects, and kidney damage. CBE presented this information to the Chicago MSD and the Milwaukee Sewage Commission. We also held a press conference warning the public not to use sludge on their gardens.

As a result of CBE's report, the Milwaukee Sewage Commission placed a warning on Milorganite bags. The Chicago MSD stopped supplying local distribution sites with Nu-Earth, and required remaining sludge users to sign a form stating they will not use it on their gardens.

CBE believes that municipal sludge is a valuable, renewable resource that can be used to offset the cost of more expensive commercial fertilizers. However, chemicals dumped by industry into public sewers irrevocably contaminate the sewage, destroying a valuable resource and costing the public millions of dollars a year.

The long-term solution to this problem is the enactment and enforcement of "pretreatment standards." They would require industry to remove toxic pollutants prior to discharge into any municipal sewage system. Sludge could then safely be used as a fertilizer.

Control of Hazardous Wastes Under RCRA

CBE testified before a Congressional Subcommittee on Oversight and Investigations concerning new U.S. EPA regulations for the definition and control of hazardous wastes.

CBE argued that the criteria used to define a hazardous waste under the Resource Conservation and Recovery Act (RCRA) are inadequate. Many existing pesticides and toxic organic wastes will not even be included in the EPA's definition of a toxic waste. Furthermore, the regulations for defined toxic wastes are not strong enough to insure safe transportation, treatment and disposal. CBE concluded that if the regulations are not strengthened, disasters that took place at Love's Canal, New York and Toone, Tennessee will occur again.

Long-Term Effects of the Pesticide EPN

In August, 1970, there was an explosion at a Stauffer Chemical Company plant in Chicago Heights, Illinois. As a result 2,500 gallons of a pesticide called EPN were released, along with several other toxic chemicals. Rescue workers and journalists were heavily exposed, and the surrounding community may have been exposed to airborne material.

According to information obtained by CBE under the Freedom of Information Act, exposure to EPN can cause delayed nerve damage, even crippling. The long-term effects of EPN are irreversible.

Following the Stauffer explosion, CBE gave an exclusive interview to the NBC affiliate station in Chicago about the threat to human health from EPN exposure. The story was carried in local newspapers, on local radio and television, and in the Washington Post. The wire service story, carried by the Associated Press, was published as far away as Wyoming.

CBE is exploring numerous channels in an attempt to see if funds can be obtained to evaluate the human health effects that may result from that exposure.

Air Pollution

EPA Full Scrubbing Proposal

CBE has supported EPA's proposal that new power plants reduce sulfur emissions by 85% through the use of scrubbers, insuring maximum use of national coal reserves in an environmentally sound manner.

Many utilities prefer burning low-sulfur western coal to installing the scrubbers necessary to safely burn high sulfur Illinois coal. CBE contends that this standard is necessary to restore the competitiveness of Illinois coal in midwestern and southern states.

Coal Combustion Air Pollution Report

CBE produced a 51 page report for the Office of Technology Assessment (OTA) pointing out the harmful effects of sulfur pollutants on crop yields.

CBE serves on a scientific advisory panel for OTA, which is producing a two year study on the effects of widespread conversion of oil and natural gas to coal. Although the report originally did not intend to address the effects of coal combustion on agriculture, CBE's findings, showing a reduction in crop yields if projected levels of coal combustion are reached, will be printed as an appendix in the final report to be published in 1979.

Interlake Coke Oven Emission Cleanup

CBE intervened in an Illinois EPA action against Interlake Steel Co. The firm is required to comply with Clean Air Act emission standards or face penalties.

The firm plans to bring its 100 coke ovens into compliance with the particulate emissions standard in 1980.

Water Pollution

Water Quality Criteria For 123 Toxic Substances

CBE's criticism of a U.S. EPA report setting forth maximum concentrations for 123 toxic substances in water, forced the agency to rewrite these reports and propose new water quality criteria.

A federal court ordered the EPA to develop water quality criteria for 123 toxins that will ensure the protection of human health, aquatic organisms, and the environment. CBE staff scientists reviewed the documents and found them to be grossly inadequate. Important scientific data had been omitted, including information demonstrating the ability of these toxic chemicals to cause cancer, birth defects, mutations and nerve damage. When the new documents are published in 1979, CBE will again review them to ensure that the standards adequately protect humans and the environment.

CBE Issues

Toxic Substances

Most chemicals in use are relatively harmless. However, toxic substances are those few chemicals that are harmful to man, causing birth defects, behavioral disorders, cancer or specific diseases. Much of the more visible and obnoxious pollution has been reduced. The existence of many toxic chemicals in the environment and their effect on humans remained unknown until quite recently since these substances often are not detectable by normal human senses - sight, smell or taste. Over the years these chemicals can accumulate in the human body. Certain chemicals are powerful poisons and exposure to them may cause immediate death; while others have delayed health effects years later.

CBE directs a large part of its program towards locating and then controlling the disposal of toxic chemicals. Authorities now believe that these few chemicals cause 60-90% of all cancers, a disease that also has become the largest single killer of children under 15 years old in the United States. CBE advocates that the government also test existing and new chemicals for their ability to cause brain damage, birth defects, and specific diseases. The cost of adequate testing and disposal of harmful chemicals is outweighed by the hidden social costs we will otherwise continue to bear - higher hospital bills, insurance rates, absenteeism, or the personal tragedy of sickness or death in the family.

Energy Policy

The energy crisis facing the United States demands innovative decisions regarding our energy policy before the 21st century. Oil and natural gas prices will continue to rise as supplies dwindle. Prohibitive construction costs and mismanagement are pricing nuclear power out of the market. Although the use of coal for centralized electricity generation could offset the shortage of other fossil fuels, there are inherent problems with this alternative. Large-scale coal burning causes severe air pollution problems and may have undesirable effects on the climate.

CBE advocates the efficient use of energy systems that are safe, renewable, economically sound, and scaled down in size. Pollution control devices can reduce air pollution problems, steps can be taken to retrieve and reuse waste heat, and centralized power plants could be replaced by small-scale facilities using renewable resources as they become economical. CBE is currently researching and advocating the practical application of renewable resources such as solar and wind. In addition, CBE is educating the public and industry on energy conservation techniques.

Air Pollution

Airborne pollutants still constitute a serious public health threat throughout the Midwest. Pollutants emitted from a smoke stack may travel miles before touching ground and frequently combine with other airborne substances to form more toxic by-products, such as acid rain.

Most of the Indiana-Illinois-Wisconsin region fails to meet the ozone standard, much of the region violates federal standards on suspended particulate matter, and Chicago exceeds carbon monoxide limits. Most of CBE's 1978 air pollution work was designed to get the states to enforce existing standards and to make sure that state agencies and legislatures did not weaken the standards.

Water Pollution

CBE has worked for a number of years to keep toxic chemicals out of our primary drinking water source, Lake Michigan, and out of recreational waters in the Midwest. As a result, most wastewater polluters in this region (with notable exceptions like US Steel and the City of Milwaukee) are close to meeting clean-up schedules in compliance with the Clean Water Act of 1972.

The federal government is passing responsibility for pollution enforcement activities to state governments. CBE currently is attempting to prevent lax enforcement and extension of compliance schedules by state agencies. We are also continuing various actions against specific polluters who are not in compliance.

Public Participation

Whether or not pollution control authorities will succumb to industry pressure to relax existing laws depends on citizen involvement in the regulatory and legislative processes. While the federal government encourages public participation at hearings, it failed to require the states to do so. As the states assume more responsibility for pollution clean-up, CBE is concerned about whether these agencies will allow public participation at this level.

CBE challenged the Administrator of the US EPA for having approved the Illinois water program without requiring mandatory public participation. The Seventh Circuit Court of Appeals ruled in CBE's favor in January, 1979 - the first time a state program has been overturned by a court. This case will serve as a precedent to use in challenging the federal public participation that the EPA will initiate in February.

ENERGY:

A PROJECT REPORT TO NRDC MEMBERS

SOME STRAIGHT TALK ABOUT HOW YOUR SUPPORT IS BRINGING RESULTS

NRDC activities, thanks to your membership dollars, span a wide range of environmental concerns: from clean air and water to forest preservation, improving mass transit and controlling cancer-causing chemicals. However none probably touches our daily lives as much as energy. NRDC's position on energy is clear: America must have the power to fuel industry, provide jobs, heat homes, guarantee national security and enrich the private lives of our people. Equally clear, however, is the need to provide that energy without poisoning the very elements that support life, without creating unnecessary safety hazards, and without reckless waste of our remaining precious energy sources.

Here is a brief summary of current NRDC activities in this critical area, selected from the NRDC Docket of Cases.

AT HOME, AT THE OFFICE
Stopping Waste & Saving Money

Studies show that buildings consume about 20% of the nation's energy for heating, cooling and lighting. *More than 50%* of that energy is wasted, those same government and private studies show. Legislation passed in 1976 and 1977 requires the Department of Energy (DOE) to issue national building energy conservation standards, which DOE has asked the Department of Housing and Urban Development (HUD) to do. Yet, despite the urgency of the matter, the standards now being considered by DOE and HUD fall shockingly short of their potential.

NRDC is monitoring this process and intends to work with both agencies to strengthen the standards. NRDC attorneys are prepared, if necessary, to go before the courts to require the strong standards intended by Congress.

———

Both HUD and the Farmers Home Administration (FmHA) have promulgated regulations requiring conservation features in homes financed under their respective programs. NRDC attorneys filed a court brief defending the FmHA standards when they were challenged in a suit brought by a building industry group. The court upheld the standards in a victory for consumers.

Proposed HUD standards were analyzed by NRDC staff, who revealed major flaws both in the standards and in the data on which they were based. NRDC attorneys filed extensive papers detailing the weaknesses of the standards, and HUD is now developing an amended proposal in response to our comments. Another victory for energy-conscious homeowners.

ENERGY USERS, BIG AND SMALL

Considering the staggering number of small electric appliances throughout the nation, the Department of Energy is developing mandatory appliance efficiency standards. The step is long overdue, and NRDC staff will participate in the proceedings which will determine the standards, to insure requirements that will be most responsive to the public's interest. The new standards should lead not only to significant energy savings, but to appliances more economical for consumer use.

———

Industrial processes consume more than 40% of America's energy, yet there is virtually no comprehensive program for industrial conservation. DOE has authority to seek utility rate structures which provide incentives to conserve, to issue guidelines for energy use, and to conduct certain necessary research. NRDC attorneys are preparing to file a legal petition to speed such actions, which would be both anti-inflationary and energy-saving.

NRDC HELPS PREVENT
ECLIPSE OF SOLAR ENERGY

Sources as varied as the President's Council on Environmental Quality and the Harvard Business School now agree that both economics and safety point increasingly to the sun. Indeed, reports by both institutions now show the extent that solar energy can help meet energy needs may have long been underestimated. Because solar energy is still relatively new, work in this field is particularly important now. For example . . .

Reports from four government agencies all indicate serious legal and institutional obstacles to the development of solar energy. These include questions of solar access, utility practices and rates, local building and zoning ordinances, and more. NRDC has therefore hired the author of two key studies which identify these issues. We will seek, with his help, to break down these barriers through test litigation and by working for legislative and administrative reform.

———

HUD, DOE, the Small Business Administration and the Department of Agriculture all now have authority to make low interest loans for a variety of solar programs. Yet few loans have actually been made. NRDC attorneys plan administrative actions and, if necessary, litigation to start these important funds flowing.

(over, please)

How Have We Done So Far?

(Some comments on NRDC projects)

"I know you will bring the same level of skills and responsibility to bear on energy problems as you have on others."

Sen. Philip Hart (Michigan)

"When we wanted to know something about toxic substances, I'd call NRDC. Those people are experts, and known to be experts, and could give us the right answers right away."

Simon Lazarus,
Former White House Staff

"NRDC never hesitated to light a fire under the bureaucracy . . . "

EPA Administrator Russell Train

"Yours is a major role in making the promise of the Clean Air Act a reality . . . thank you for your generous and invaluable assistance . . . "

Sen. Thomas Eagleton (Missouri)

"NRDC is a conservation organization that has really made a difference."

New York *Times* Editor John B. Oakes

"NRDC has added a new and effective voice to the citizens of Sacramento who are concerned with environmental protection, particularly the American River . . . It is my pleasure to commend you."

Mayor Richard Marriott, Sacramento

"There is no doubt that your leadership in [wildlife protection] has been immensely important and we are delighted to be associated with you."

William Conway, General Director,
New York Zoological Society

"Your creative efforts to make the Corps of Engineers and the Soil Conservation Service more aware of the full costs of their projects are certainly commended. I hope you will continue them."

Rep. Henry Reuss (Wisconsin)

The Natural Resources Defense Council is a non-profit environmental organization. Our staff of 31 lawyers, scientists and environmental specialists wage a daily fight to preserve our natural world. NRDC's projects, besides clean energy, include wilderness and wildlife preservation, air quality maintenance, improved mass transit, control of cancer causing agents in our environment and protection of our waterways and oceans.

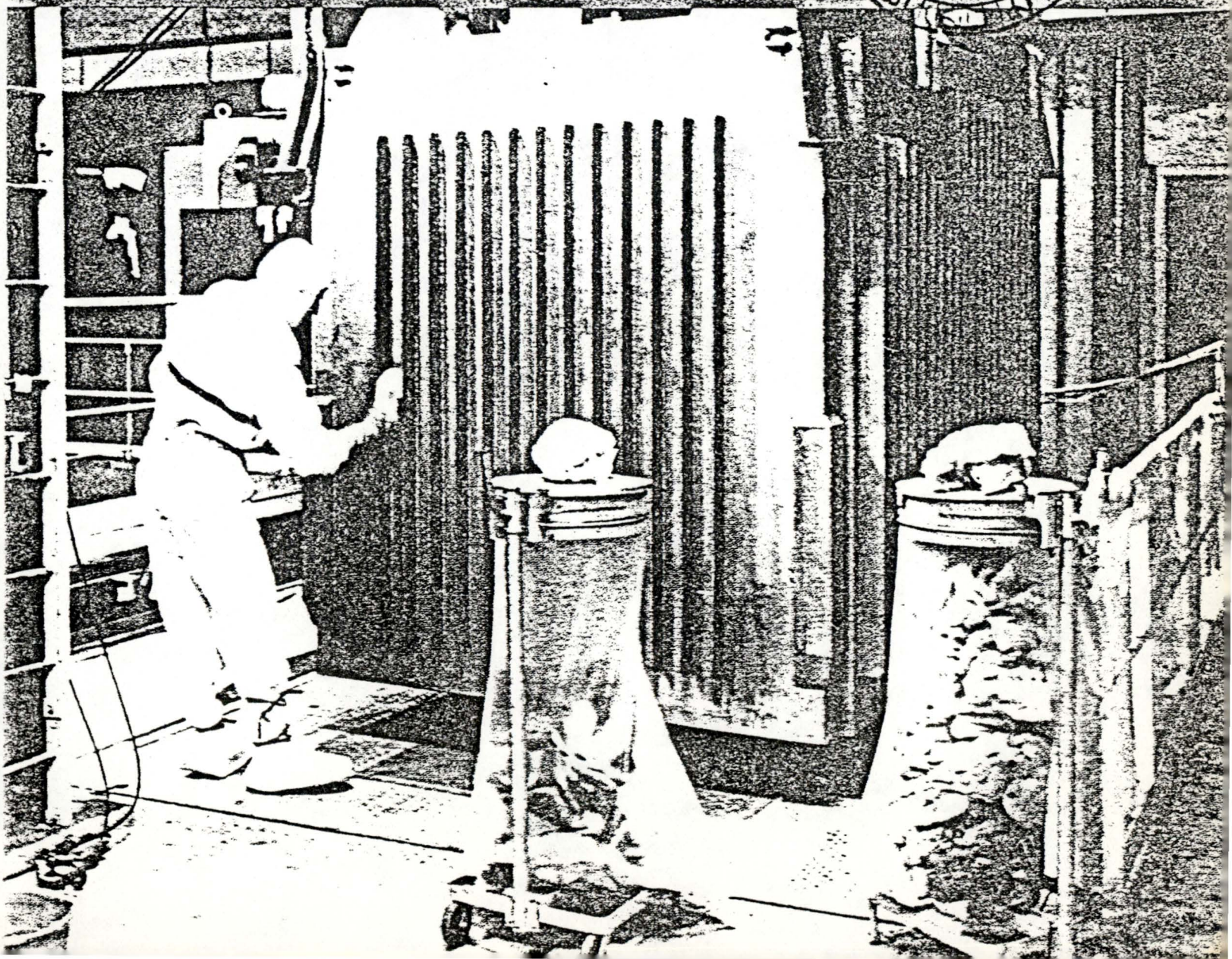
Our Staff, located in New York, Washington, D.C., and Palo Alto, California, includes experienced lawyers with an enviable record of court success on behalf of the public. There are two full-time physicists. A forestry specialist. A biochemist. Transportation experts. Specialists in air quality, in water pollution and more. ***Our trustees*** are distinguished men and women from all sectors of our society. Scientists, academics, attorneys, representatives of business and the general public. ***Our members*** number almost 40,000, and are from every state. They receive newsletters and reports and know they are getting real action for their money.

NRDC

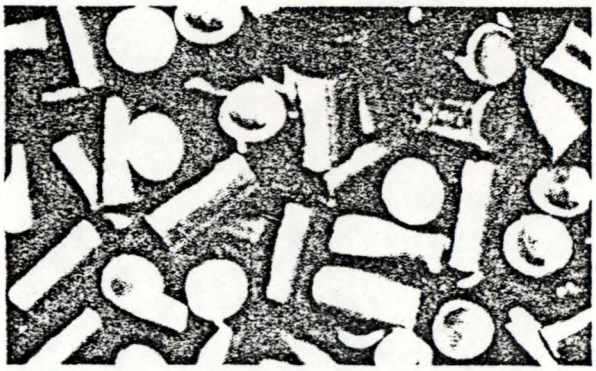
NATURAL RESOURCES DEFENSE COUNCIL, INC.

122 EAST 42ND STREET, NEW YORK, N.Y. 10017

What looks like a yellow-green powder, is packed in small pellets, and can destroy the city where you live?



Inside these pellets is plutonium oxide. If you were to inhale even a microscopic amount, cancer would result. Pellets like these fuel nuclear reactors, creating an almost poetic balance: to provide the electricity for a medium-size American city, a light-water reactor produces as a by-product about enough plutonium to destroy that city.



Do you know how close the nearest plutonium is? And who is keeping an eye on it?

It is in reactors and reprocessing plants throughout the country . . . and in transit between. It is shipped between New York, Tennessee, California, Illinois, Oklahoma, Washington and other places on trucks, usually in 50 kilogram quantities. 50 kilograms is about ten times the amount of plutonium used in the Nagasaki bomb.

Not all well-traveled and deadly radioactive material is fuel. Much of it is waste. Once thought of as a mere by-product of nuclear activity, radioactive waste now forms a burgeoning and lethal legacy for which government and private industry are poorly prepared. From spent fuel rods themselves to such mundane equipment as workmen's gloves, the hand-me-downs of nuclear power are a 230-million-gallon inventory in the U.S.

More is added every day.

At one New York waste storage site, 600,000 gallons of high-level radioactive waste rest in a carbon steel tank which is believed to be corroding slowly. The facility's private owner plans to leave the problem to the state, which says it cannot afford disposal bills potentially as high as a half a billion dollars. The federal government, often given to optimistic views of the nuclear industry has called the problem "gargantuan".

The problem is not new, but the scope is. A study released recently by the U.S. General Accounting Office shattered many illusions about the handling of this problem. Its most serious charge is the lack of demonstrated technologies for the safe disposal of *existing high-level radioactive waste. To continue piling up more waste from present facilities, and to license new ones without providing for their waste is more than senseless.*

The Natural Resources Defense Council, through its legal and scientific staff, is forcing certain responsible steps.

- In the U.S. Court of Appeals a decision supported our attorneys who sought to require by law an analysis of the environmental consequences of a nuclear facility *before* it is built. This decision was key in bringing the long-range implications of nuclear waste under public scrutiny.

- NRDC attorneys then sued the Nuclear Regulatory Commission to require safety findings on the intended handling of a facility's waste products. This suit seeks only the caution we feel is required by the Atomic Energy Act, and by common sense. (The case is now pending.)

- Focusing on military nuclear waste, NRDC has challenged the construction of one-million-gallon storage tanks without a safety appoval having been first obtained from the Nuclear Regulatory Commission. The tanks will be located in Georgia, and Washington. Clearly the problem cuts across all geographic boundaries.

The simple fact is, the problem of radioactive waste must be solved promptly. Private citizens have few alternatives to force the sluggish bureaucracies of Washington to address these massive technological problems.

But citizens' voices, supported by a court mandate, can get things done.

To continue leading the fight for nuclear responsibility, NRDC must seek financial support of over $300,000 annually. We all wish this money did not have to be spent. But it does if we want to maintain control over institutions profoundly influencing our future.

Please help us.

Your tax-deductible membership contribution will be put to work right away. ***We pledge to you no less than we ourselves expect: vigorous legal advocacy of sound policies, scientific honesty in assessing the facts, and candid reports to members on developing situations.***

Please don't delay. The legal work required in this field is extensive and costly. To move our nation toward safe and peaceful energy sources will be difficult, but, in the words of one federal official, "those who walk this earth long after we, will bless the day we began." Make today that day.

Sincerely

John Adams

John H. Adams
Executive Director

How A Nuclear Power Plant Dies . . .

It starts to die the day it goes to work. As a succession of atomic fuel cores is inserted, used, and extracted from the plant, the radiation level in the plant structure begins to rise.

This is no accident, but a normal part of the operation of the plant.

After approximately 30 years, the plant must be closed. Every nuclear plant suffers the same fate. It must be closed and sealed or dismantled.

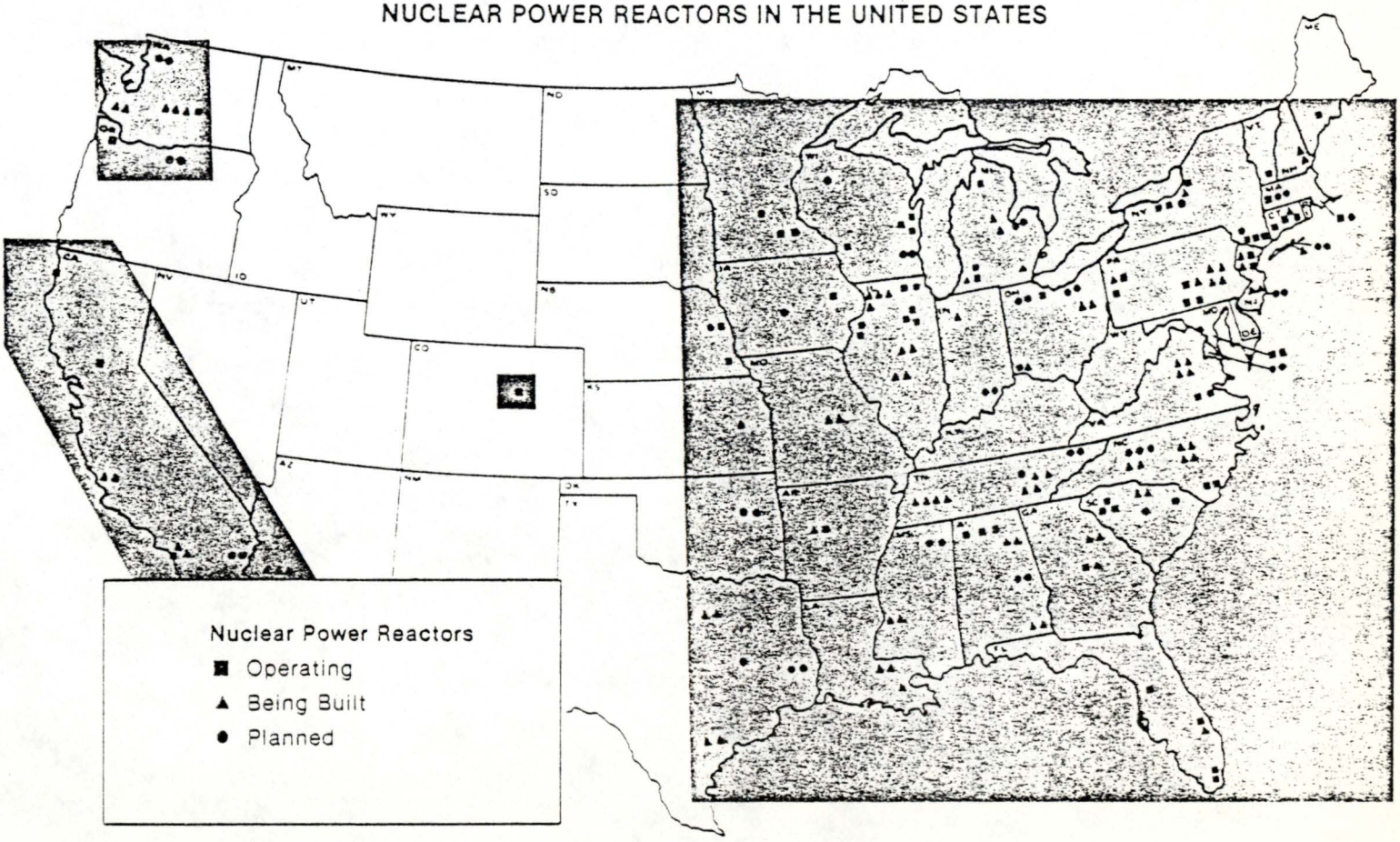
And guarded. Because scientists estimate that the poisoned structure will be a threat for *at least 200 years,* if not much longer. These inoperable plants cannot be dismantled and moved without great expense and enormous risk of exposure to surrounding areas, due to the thousands of tons of steel and concrete permeated with intense levels of radiation.

Sometimes the mothballing of a reactor isn't so easy. The Marcoule, France reactor, which produced plutonium for French nuclear weapons, was shut down ten years ago and placed under guard. But it has already developed cracks and is leaking radiation. It will have to be dismantled completely and entombed in concrete. Even then, the guards will have to stay, alert for radiation.

With only a 30-year lifespan, the problem of "dead but dangerous" nuclear plants cannot be put off until later. Fifteen plants in the U.S. have already been closed, and their disposal is a major problem today.

Where are nuclear plants located? The answer is simple: all over. Take a look at this map provided by the U. S. government . . .

NUCLEAR POWER REACTORS IN THE UNITED STATES



We know you have questions . . .

What is NRDC?

The Natural Resources Defense Council is a non-profit environmental organization. Our staff of 31 lawyers, scientists and environmental specialists wage a daily fight to preserve our natural world. NRDC's projects, besides clean energy, include wilderness and wildlife preservation, air quality maintenance, improved mass transit, control of cancer causing agents in our environment and protection of our waterways and oceans.

How do I know NRDC gets results?

It's easy. Just listen to the people who keep their eye on the environment:

The Nation recently described NRDC's Clean Energy Project as "in the forefront of plutonium issues . . . "

* * *

Former EPA Administrator Russell Train has observed that "NRDC never hesitated to light a fire under the bureaucracy . . . "

* * *

Sen. Edmund Muskie said, "No environmental group has done more than NRDC to see that federal water pollution laws are interpreted properly and carried out in the timely, aggresive manner intended by Congress."

* * *

John B. Oakes, Senior N.Y. *Times* Editor, called NRDC "a conservation organization that has really made a difference," and stated that "NRDC is playing a vital and increasingly important part in the battle for the environment and for the future."

Who is NRDC?

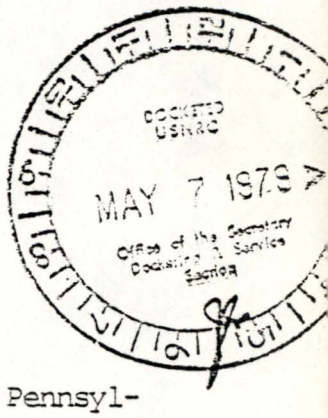
Our Staff, located in New York, Washington, D.C., and Palo Alto, California, includes experienced lawyers with an enviable record of court success on behalf of the public. There are two full-time physicists. A forestry specialist. A biochemist. Transportation experts. Specialists in air quality, in water pollution and more. *Our trustees* are distinguished men and women from all sectors of our society. Scientists, academics, attorneys, representatives of business and the general public. *Our members* number almost 40,000, and are from every state. They receive newletters and reports and know they are getting real action for their money. *You* can add your name to this growing roster. Become a member today.

nrdc

NATURAL RESOURCES DEFENSE COUNCIL, INC.

122 EAST 42ND STREET, NEW YORK, N.Y. 10017

917 15th ST., NW, WASHINGTON, DC 20005 2345 YALE ST., PALO ALTO, CALIFORNIA 94306



Dear Member:

I am writing you as a nuclear scientist to help put the recent Pennsylvania crisis in perspective.

While at the Atomic Energy Commission, it became clear to me that the notion of "the peaceful atom" generating electricity "too cheap to meter" was a pipe dream. The nature of nuclear fuel, and the technology required to harness it, create situations which invite accidents such as Three Mile Island. Even more ominous is the vast problem of radioactive wastes, produced by all nuclear reactors. For those reasons, I decided to use my physics training to work for solutions to the problems of nuclear power, and particularly for energy alternatives. That is why I joined the staff of NRDC, along with my associate Dr. Thomas Cochran.

The principal lesson of Three Mile Island is obvious: the work of scrutinizing nuclear power by groups like NRDC, and the work of pushing for energy alternatives is more important than ever. We simply cannot leave our energy "eggs" in the nuclear basket.

Yet that is just what federal energy incentives call for, illustrated by their lopsided nature: while nuclear power industry has received $17 billion in incentives, incentives for solar power amount to well under a billion dollars. Yet the fact is, according to the President's Council on Environmental Quality, "with a strong commitment to accelerated solar development and use, it should be possible to derive one-quarter of U.S. energy from solar by the year 2000." A solar-oriented development makes profound sense: no dangerous wastes, no unreliable foreign sources, no opportunities for terrorist activity, and no Harrisburgs.

NRDC is determined that the bitter lesson of nuclear unpredictability learned at Three Mile Island is not distorted or lost on the decision makers in the government. We intend to push our extensive Clean Energy Project even further if you will help us. Our record is one of solid accomplishment:

*NRDC attorneys sued the Nuclear Regulatory Commission (NRC) to prohibit the licensing of plutonium recycle facilities until it completed an environmental review of the consequences.

*NRDC intervened in opposition to the licensing of the Clinch River Breeder Reactor, and was substantially responsible for disclosing the weaknesses in the licensing proposal, and pushed for thorough analysis of the plant's safety and environmental problems. President Carter decided, partly based on this information, to defer commercialization of the breeder reactor and the proceedings have been suspended.

(over, please)

*NRDC also sued the NRC for its refusal to supply information on nuclear facility safeguards. NRDC cited the Freedom of Information Act, while the government claimed exemption under the too-familiar umbrella of national security. The case is pending.

*Conservation of fossil fuel now recklessly wasted could reduce much of the demand for energy. NRDC prepared an "alternative energy scenario" which demonstrates that the Pacific Northwest can meet its energy needs through 1995 by relying on conservation and solar devices, without building any new power plants. (Government studies confirm our findings.) We now plan to develop strategies for implementing the necessary steps.

*When federal housing agencies set energy conservation standards, the building industry challenged them. NRDC supported the regulations in court, where they were upheld. We then filed official comments detailing weaknesses in the less stringent HUD standards, and that agency is now strengthening its standards.

*Several federal agencies now have authority to make low interest loans for solar installation programs, but few such loans have been made. NRDC is prepared to take administrative or legal action if necessary to start these important funds flowing.

In short we are working to demand that the U.S. not remain dependent on risky and costly nuclear energy. Help us guarantee a future free from headlines about "meltdowns," "radiation levels," and "evacuation plans." Make a special contribution today to NRDC to help us continue the fight. This year we have committed over $400,000 to the fight for clean energy, a massive commitment for our resources.

When I left the AEC to work for sensible policies, I believed those policies were a possibility if the public could only be informed. Help us finish that job.

Sincerely,

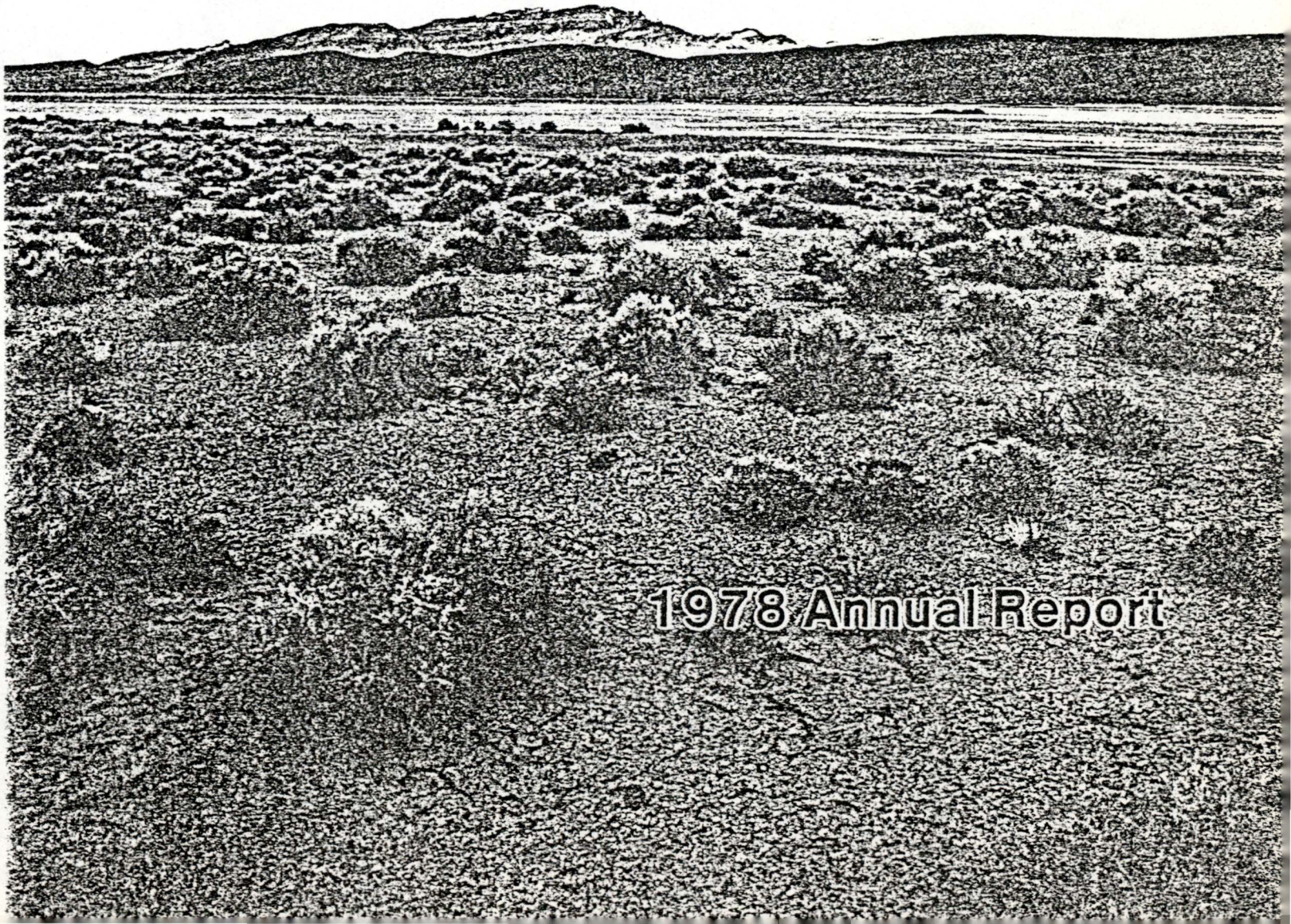
Dr. Arthur Tamplin
NRDC Nuclear Biophysicist

P.S. If you have already contributed to NRDC this year, please take this occasion to make an additional contribution -- it is needed now more than ever. If you have not yet renewed, surely this is the time. Thank you.

CBE Environmental Review

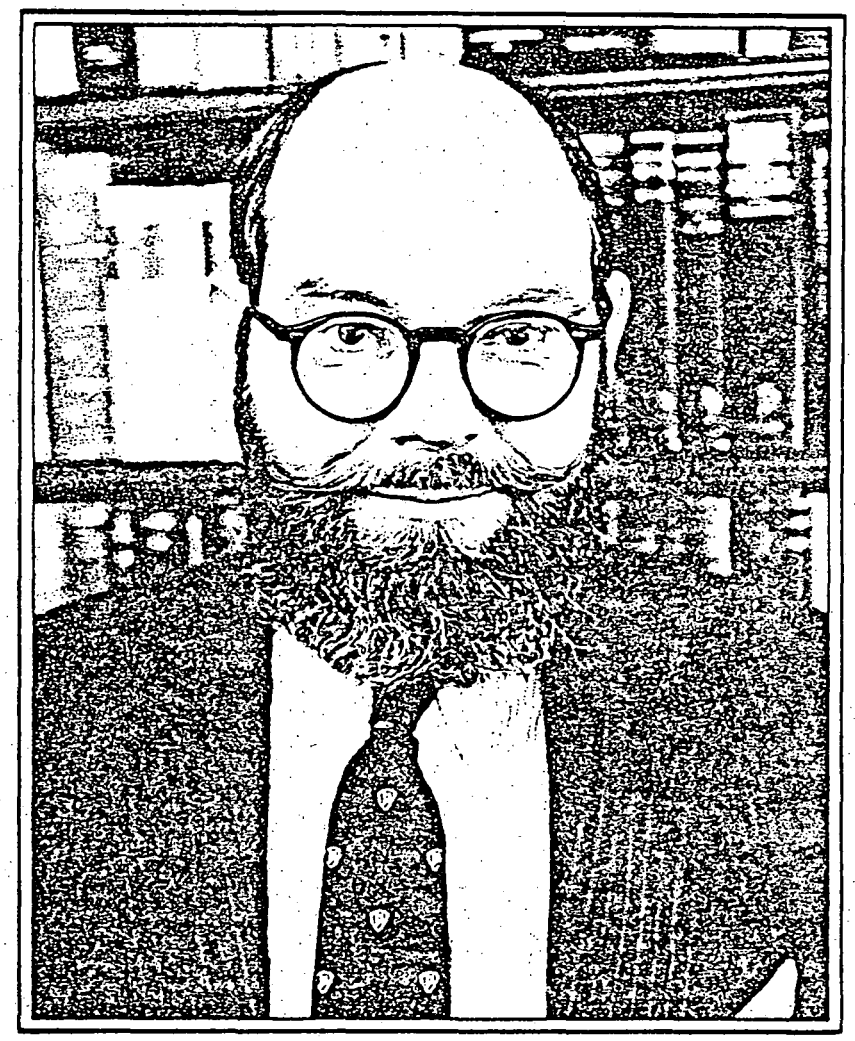
PUBLISHED BY CITIZENS FOR A BETTER ENVIRONMENT

FEBRUARY/MARCH 1979



1978 Annual Report

In Memoriam

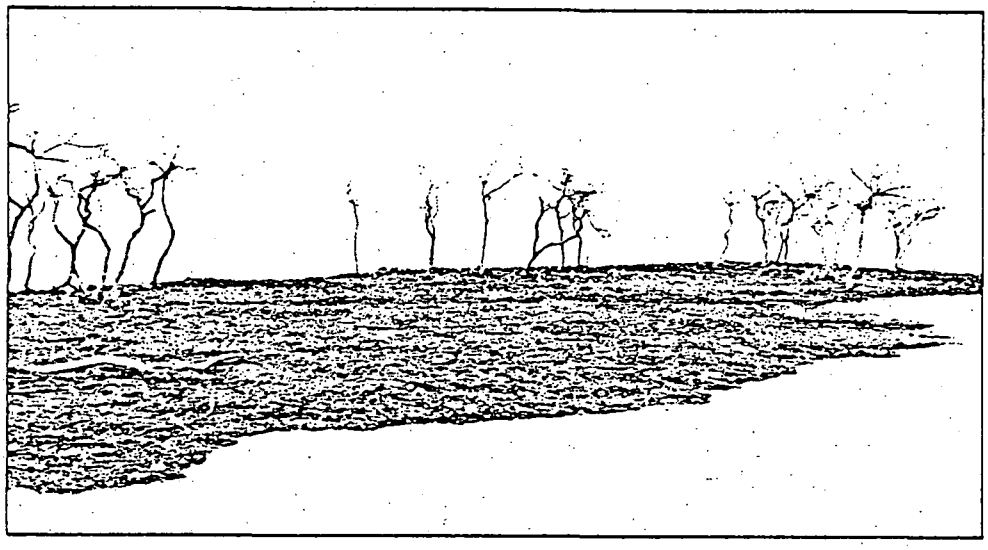


David Dinsmore Comey
1934-1979

David Dinsmore Comey, President and Executive Director of Citizens for a Better Environment, died in an automobile accident Friday, January 5, 1979. Mr. Comey became President of CBE in June of 1976. He served on numerous federal scientific advisory panels, was the Illinois member of the Board of Directors of the Mid-American Solar Energy Corporation, and was the author or co-author of many reports on water pollution, environmental and health effects of toxic substances, nuclear power plant safety, and other areas of energy policy. In 1974 he received the first annual Environmental Quality Award, given by the U.S. Environmental Protection Agency "for services that have immeasurably improved the design and safety review of nuclear reactors."

David Comey was an important figure in the national environmental movement and in our lives. He will be greatly missed.

Summary of 1978 Activities



Citizens for a Better Environment is a national environmental organization with offices in Chicago, Illinois; Milwaukee and Madison, Wisconsin; and San Francisco, California. We work in five primary areas: air pollution, water pollution, toxic substances, energy policy, and environmental education.

During 1978, our offices used the following general strategies in attacking problems in these areas.

Air Pollution

The Clean Air Act Amendments of 1977 put air pollution control efforts on "hold" for 1978. This legislation required the states to formulate new plans on how they would comply with the Clean Air Act and submit them to U.S. Environmental Protection Agency (EPA) by January 1, 1979. EPA would then approve or require modifications by July 1, 1979. Until that time, however, new litigation by public interest groups is virtually precluded because any lawsuit could be rendered moot by the new plan. In addition, states such as Illinois are behind schedule in formulating their plans, thus delaying action on air pollution problems still further.

CBE pursued as many actions against air pollution as we could within the restrictions imposed by the 1977 amendments. We concentrated primarily on fighting various federal, state, and utility attempts to relax the standards governing emissions of sulfur dioxide — a pollutant produced primarily by burning fossil fuels, which has a serious adverse impact on agriculture, on other aspects of the environment, and on human health.

Water Pollution

Many polluters are now on compliance schedules imposed under the Clean Water Act. The U.S. EPA is in the process of transferring control of water pollution control programs to the states. As a result, CBE has concentrated much of its effort in this area on ensuring that the public will have the same right to participate in state enforcement actions that it had in federal enforcement actions.

Toxic Substances

During 1978, CBE's work on toxic substances control expanded to include the problem of disposing of the thousands of pounds of hazardous wastes produced in this country each year. We brought suit against U.S. EPA for its failure to promulgate regulations for disposal of hazardous wastes, and we asked that sludge produced by sewage treatment plants — which can be contaminated with toxic chemicals — be regulated as a hazardous waste. We also continued to help U.S. EPA draft proper regulations for disposal of hazardous wastes.

Our work on helping the U.S. EPA draft regulations implementing the Toxic Substances Control Act (TOSCA) continued, with much interchange between our staff and officials in Washington. Many of our proposals were adopted, and we have continued to have considerable influence over the shaping of the regulations.

We have expanded our work on pesticides, particularly in the Midwest, and on alternative pest control strategies which would de-emphasize the use of chemicals.

Energy Policy

CBE has devoted a good deal of attention this year to having state regulatory agencies reform their electric rate structures. We sought reforms that will discourage construction of unneeded power plants and encourage more efficient use of electricity.

Although we did produce a considerable amount of material on nuclear power during 1978, we are gradually phasing down our work on nuclear issues and focusing instead on the advantages of solar energy. This is because we believe the nuclear industry's doom is sealed by the unprofitability of nuclear power. Our main concern now is that utilities moving away from nuclear should not automatically switch to coal, which could have a serious adverse effect on the environment. As an alternative, we hope to educate the public in the advantages of using renewable sources of energy.

Environmental Education

We increased the paid circulation of our monthly newsmagazine, the *CBE Environmental Review*, from 3,000 to more than 8,000, and a number of our reports were widely reprinted and translated into foreign languages.

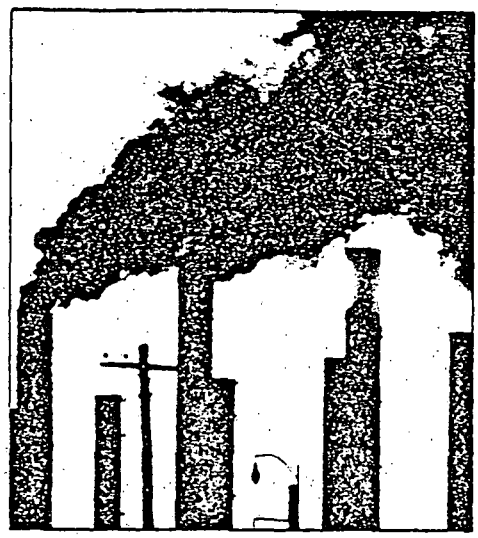
We also appeared on numerous television news programs and made presentations to a wide variety of university audiences and professional societies.

Air Pollution

Report to Congress on Air Pollution from Coal Combustion

CBE serves on a scientific advisory panel to the Office of Technology Assessment (OTA) of the U.S. Congress. The panel is producing a two-year study on the effects of widespread conversion to combustion of coal from oil and natural gas. The report originally did not intend to address the health effects of coal combustion, nor the effects on agriculture, forests, and natural waterways.

CBE produced a 51-page report on the effects of sulfur pollutants from coal on agricultural crops, which showed that considerable



reduction in crop yields would result if projected levels of coal combustion are achieved. CBE's report will be printed as an appendix to the final OTA report, which is scheduled to be published in February, 1979.

CBE also persuaded OTA to retain the Harvard School of Public Health to analyze the potential impact on health of increased coal combustion.

EPA Full Scrubbing Proposal

One of the reasons why Congress established performance standards for new power plants in the Clean Air Act was to promote development of pollution-control technology, sometimes called scrubbers. This was so that maximum use could be made of the nation's coal reserves, in an environmentally acceptable manner.

But the effect of these standards has been to provide many midwestern utilities with an incentive to burn low-sulfur coal from the West rather than to install scrubbers and burn high-sulfur coal. Congress corrected this imbalance in the Clean Air Act Amendments of 1977, which require new power plants to achieve a percentage reduction in sulfur emissions through technological means.

While the U.S. EPA has proposed that emissions be reduced by 85% through scrubbing on all new plants, the Department of Energy (DOE) and the utility industry are exerting strong pressure on EPA to allow plants burning low-sulfur coal to scrub only part of their emissions.

CBE filed a written comment in support of the 85% standard proposed by EPA, contending that this standard is necessary to restore the competitiveness of high-sulfur Illinois coal in midwestern and southern states.

Cadmium as an Air Pollutant

Under the Clean Air Act Amendments of 1977, the U.S. EPA was to have determined by August, 1978, whether emission of cadmium into the air poses a threat to public health. EPA published several reports in the spring of 1978, documenting the sources of atmospheric cadmium, the toxicity of this metal, and the segments of the population most at risk. CBE reviewed and commented on several of these reports.

The EPA documents indicate that exposure to cadmium can result in kidney damage, birth defects, genetic damage, and cancer. Because the levels of cadmium to which Americans are exposed in their air, water, and food already approximate levels required to produce kidney damage, the EPA concluded that the public should be protected from exposure to cadmium from all sources. Despite this conclusion, however, EPA has failed to declare cadmium a hazardous air pollutant that is to be regulated under the Clean Air Act. CBE has monitored EPA's decision-making process with regard to cadmium, and we hope to pressure EPA to establish adequate standards for permissible levels of cadmium in the air.

Illinois

Sulfur Dioxide Control

CBE has testified at hearings to oppose proposed relaxations of sulfur dioxide standards. We testified before the Illinois Pollution Control Board (PCB) on Illinois Power Company's request for a relaxation on the sulfur-dioxide standard for its Baldwin Station in Perry County and before the Missouri Air Conservation Commission in opposition to the commission's proposal to relax the sulfur-dioxide standard for Union Electric Company's Sioux Power Station near St. Louis.

Compliance Methods at Powerton Station

CBE intervened in Commonwealth Edison's request to the Illinois PCB for a variance for its Powerton Station near Pekin, Illinois. Edison notified the PCB that it planned to achieve compliance with the Clean Air Act Amendments of 1977 by substituting low-sulfur western coal at Powerton for high-sulfur Illinois coal.

CBE filed a brief in opposition to the variance, contending that installation of scrubbers would be a more reliable compliance alternative since Edison's western coal suppliers may not be able to meet their contractual obligations.

The PCB granted Edison's variance, giving the utility until July 1, 1979 — the deadline under the Clean Air Act Amendments — to modify the Powerton Plant so that it can burn western coal.

Hearings on Job Loss Among Illinois Miners

When Commonwealth Edison announced its decision to meet state sulfur-dioxide emission standards by burning low-sulfur western coal at its Powerton Station, CBE immediately petitioned Illinois Governor James R. Thompson to convene a public hearing on the matter because of possible job losses to Illinois coal miners.

Under the Clean Air Act Amendments of 1977, the Governor can petition the President to prohibit Edison from burning out-of-state coal if economic disruption will occur in a local coal mining economy.

CBE said that Illinois coal could be burned by Edison in an environmentally acceptable manner without job loss if Edison would install scrubbers at Powerton. Two experts on scrubber technology testified on behalf of CBE at the Powerton hearings.

Draft EIS for Wyoming Coal Region

CBE filed a comment on the draft environmental impact statement being prepared for the Southwestern Wyoming coal region. We asked the Department of the Interior to consider the socioeconomic impact in Illinois if Commonwealth Edison begins burning Wyoming coal at its Powerton Station.

Interlake Coke Oven Emission Cleanup

Interlake, Inc., a Chicago steel company, has been operating 100 coke ovens in Chicago without controlling particulate emissions. Last year simultaneous enforcement actions were brought by the Illinois EPA and the U.S. EPA, and CBE intervened in the state case. While CBE and the state were negotiating with Interlake, the U.S. EPA went ahead with a settlement that would permit the company to delay full compliance until after July 1, 1979, the deadline set under the Clean Air Act Amendments of 1977. CBE submitted a comment to the Department of Justice, and the U.S. District Court asked U.S. EPA and Interlake to file briefs on CBE's comment. The court ultimately approved the proposed settlement between Interlake and U.S. EPA, but this year it was decided that Interlake will be subject to noncompliance penalties after July 1, 1979, with expenditures for pollution control to be deducted from the penalties.

Wells Manufacturing Case

Wells Manufacturing Company's foundry in Skokie, Illinois, was causing severe odor problems when CBE brought suit against the operation based on complaints made to CBE canvassers. The Illinois PCB ruled in CBE's favor and ordered Wells to pay a fine of $9,000. However, Wells appealed the case, which was argued before the Illinois Supreme Court this year.

Because Wells had not obeyed the original order from the Illinois PCB, the state and CBE filed an action against Wells to enforce the original order. However, this action was stalled awaiting the outcome of the case before the Supreme Court.

The Supreme Court ruled against CBE and the state, holding that, to enforce any odor restriction, the state must prove that the technology necessary to control the odor exists.

We have filed a petition for rehearing on the grounds that the court overlooked testi-

mony from Wells which showed that they can control the problem.

Vehicle Inspection and Maintenance

Of the 105 areas in the United States with populations of more than 200,000, only Honolulu, Hawaii, meets the federal air quality standards for ozone and carbon monoxide. In Chicago, plans for cleaning up these pollutants, which are largely produced by automobiles and other mobile sources, must be strengthened, because industrial controls and the federal automobile emission control program are not enough by themselves to bring Chicago into compliance with federal standards. Local governments are required under the Clean Air Act Amendments of 1977 to develop a package of control measures that will reduce use of the automobile and will abate pollution for individual cars.

In early 1979 the Illinois EPA is expected to submit to the Illinois General Assembly a proposal for mandatory vehicle inspection and maintenance (I/M) in the larger metropolitan areas of the state. This program will require all vehicles to undergo an emissions test and then will require control of vehicle emissions in excess of appropriate levels.

CBE and the Chicago Lung Association will publish a brochure on I/M as part of a campaign to make the public aware of the need for controlling automotive emissions. CBE will also testify before the Illinois legislature in favor of a strong I/M program for metropolitan areas.

CBE v. Bulk Terminals

In 1977, a leak in a storage tank containing silicon tetrachloride at Bulk Terminals' facility in Chicago forced evacuation of residents and businesses in a wide area. CBE filed a complaint before the Illinois PCB, but Bulk Terminals asked the Circuit Court of Cook County to dismiss the suit. Ultimately the Illinois Supreme Court ruled in CBE's favor and the U.S. Supreme Court refused to review the case. Bulk Terminals went to the Illinois Appellate Court with yet another appeal, but their appeal was dismissed. The matter is now before the Illinois PCB.

California

Bay Area Air Quality Planning

The Association of Bay Area Governments (ABAG) spent $4.3 million in federal money to develop a regional Environmental Management Plan. A major portion of that plan focuses on Bay Area air quality because the region fails to comply with federal standards for ozone, carbon monoxide, and particulates. Although CBE was in substantial agreement with the proposed plan produced by ABAG, the association severely weakened this plan under pressure from area industry. In response, CBE was forced to raise the question of whether the Bay Area would be able to comply with federal clean air standards, mandated under the Clean Air Act.

CBE critiqued the original ABAG plan and worked through the plan's review stages seeking to have it strengthened so that the Bay Area will be able to comply with federal standards.

Bay Area Sulfur Dioxide Petition

The Bay Area Air Pollution Control District (BAAPCD) currently imposes a 6,000 parts per million (ppm) stack gas limit for sulfur-dioxide emissions. The California Air Resources Board (CARB) and the U.S. EPA have requested that it revise this standard in order to prevent deterioration of Bay Area air. The BAAPCD has responded by studying the problem.

CBE filed a petition with the CARB asking that it step in and set a stronger standard. In October the CARB voted in principle to impose 300 ppm limits on acid plants and 150 ppm limits for sulfur recovery units.

Pacific Gas & Electric Variance Request

Pacific Gas & Electric Company (PG&E) operates several oil-fired power plants in the Bay Area. Two of these, located in heavily industrialized Contra Costa County, have been chronic violators of local air pollution codes. The company has received more than 40 violation notices from the BAAPCD, but has not corrected the problem. In February the company requested a two-year variance protecting it from prosecution while it investigates possible solutions to the problem. CBE opposed this request because we feel the excessive air pollution has been caused by slipshod operation and maintenance, equipment malfunctions, and dirty fuel — all problems that can be corrected immediately.

CBE intervened before the BAAPCD Hearing Board and provided the only testimony opposing the variance. Our involvement set a precedent for public involvement in pollution issues, as our testimony was accepted by the Hearing Board over the angry objections of the PG&E attorney who sought to have it stricken from the record.

In August, the Hearing Board voted to deny the variance. PG&E appealed the decision to the California Supreme Court, but this appeal was denied in December.

New Source Review Regulations

Under the Clean Air Act, states must develop a means of analyzing and controlling increases in emissions from new sources of air pollution and from modifications of existing sources. California has used new source review regulations for some time and now is in the process of reevaluating their efficacy.

CBE presented testimony in hearings before the BAAPCD on the definition of best available control technology (BACT) and before the CARB on in-stack monitoring. CBE also presented a comment on New Source Review Rules to the Bay Area Air Quality Management District (BAAQMD).

Urich Oil Refinery Construction Permit

The BAAPCD issued tentative approval for the construction of a 10,000-barrel-per-day oil refinery in Martinez. The Urich Oil Company refinery was expected to increase emissions of hydrocarbons and nitrous oxides by 87,000 pounds per year and 88,000 pounds per year respectively, in an area already heavily impacted by air pollutants from other refineries. The estimated increases fell just short of the regulatory line for requiring offsets.

CBE submitted comments exposing the adverse environmental impact the refinery would have and asking that it be required to provide emission reductions from other air pollution sources to offset the increases from its own facility. When the permit was approved, CBE appealed for a hearing on the ground that cleaning of storage tanks at the proposed plants was not controlled adequately to prevent hydrocarbon emission increases in the area of more than 250 pounds per day.

In November, a meeting among the BAAQMD, Urich Oil, and CBE resulted in an agreement on permit conditions that would result in a 90% control of hydrocarbon emissions.

Kaiser Cement and Gypsum Corporation Construction Permit

Kaiser Cement and Gypsum Company has received an authority to construct a 1.6 million ton per year cement plant in Permanente, California. The plant will replace their existing plant, which is the largest point source of pollution in the South Bay. The new plant will emit fewer particulates and less sulfur dioxide and nitrous oxides than did the previous plant, but it does not contain BACT for control of sulfur-dioxide emissions.

In December, CBE filed an appeal for a hearing with the BAAQMD Hearing Board regarding the issuance of a construction permit to Kaiser. Hearings are scheduled to begin in January, 1979. CBE is primarily interested in having BACT for sulfur dioxide installed at the plant.

Wisconsin

Pleasant Prairie Power Plant

CBE is preparing for a legal battle in U.S. District Court to force Region V of the U.S. EPA to require use of scrubbers on a coal-fired power plant to be built near Pleasant Prairie in Kenosha County, Wisconsin. Wisconsin Electric Power Company (WEPCO), which owns the two 580 Megawatt units, had proposed to meet federal new source performance standards and sulfur-dioxide limitations by burning low-sulfur coal from Wyoming. CBE found, however, that coal contracted for use at the Pleasant Prairie plant is not of sufficient quality to ensure compliance with federal law.

CBE filed a brief before the Wisconsin Public Service Commission (PSC) in August, outlining our contentions. Although the PSC stopped short of ordering WEPCO to install scrubbers on the plant, the utility was ordered to install devices to monitor stack emissions.

Edgewater Power Plant

In a related action, CBE is attempting to have scrubbers installed in the Edgewater Power Plant, Unit V, which is owned by Wisconsin Power & Light Company. This case will probably be decided in federal court in 1979.

Non-Attainment Area for Suspended Particulates

CBE filed comments with Region V of the U.S. EPA objecting to the failure of the Wisconsin Department of Natural Resources (DNR) to designate a large portion of southern Milwaukee County as a non-attainment area for total suspended particulates. This designation should have been made when the DNR submitted the first part of Wisconsin's State Implementation Plan to the EPA.

CBE noted that the area in question was not designated as a non-attainment area although records show numerous violations of the air standard there. Designation as a non-attainment area, however, would limit development, under the provisions of the Clean Air Act. The County of Milwaukee is currently undertaking $56 million in construction in the area, including the Mitchell Field Airport. CBE believes that the DNR's failure to designate the area as a non-attainment area was for political rather than environmental reasons.

EPA Region V found CBE's comments to be substantive and ordered the DNR to redesignate a large portion of Milwaukee County according to CBE's recommendations. DNR submitted a compromise proposal which was also rejected by EPA. The DNR's third submittal was accepted and includes almost the entire area CBE felt should be designated. As a result of our efforts, the size of the non-attainment area for particulates in Milwaukee County was nearly doubled.

Milwaukee Solvay Coke Company

CBE formally petitioned the U.S. EPA's Civil Penalty Panel and Region V of EPA to impose a non-compliance penalty against Milwaukee Solvay Coke Company, a foundry coke manufacturer and the worst particulate polluter in Wisconsin.

Milwaukee Solvay Coke, a wholly owned subsidiary of Moore-McCormack Resources of Wilmington, Delaware, has been in violation of federal and state air pollution laws since 1974 and still has not taken the steps necessary to achieve compliance. In light of this "bad faith" on the part of the company, CBE has objected to the relatively small fine imposed by the Wisconsin DNR for the company's pollution violations. The fine imposed is so low that the company derives financial advantages from having continued to pollute; thus the company is rewarded for its stalling tactics and disregard of the health of Milwaukee residents.

The regional office of EPA in Chicago and the chairman of the EPA Civil Penalty Panel have decided to defer further action until after July 1, 1979 — Solvay Coke's court-ordered deadline for compliance and the date on which more specific and binding regulations for coking facilities go into effect under the Clean Air Act. CBE will initiate action before the deadline in order to ensure that proper enforcement is pursued and that health standards are met.

Wisconsin Paperboard Company

In response to numerous complaints from residents of Milwaukee's East Side and from city officials, CBE demanded that the Wisconsin DNR investigate improper plant procedures at Wisconsin Paperboard Company. Prolonged emissions of oil and soot from the plant were the result of poor maintenance and inadequate equipment on a boiler burning fuel oil.

As a result of CBE's efforts, the DNR instituted off-hours surveillance of the plant and subsequently issued two state notices of violation to the company. The company hired a new engineer, upgraded its maintenance, and installed necessary combustion equipment. The dangerous emissions have effectively been curtailed.

J.I. Case Company

CBE discovered that the J.I. Case Company of Racine, Wisconsin, had received Wisconsin DNR approval to construct two separate sand-core making processes with the potential to emit more than 160 tons of particulates annually. But no review to determine the impact of this plant on area air quality has been undertaken, as required by the Clean Air Act.

The DNR was forced to admit that the engineering review had been conducted incorrectly for this plant. Since that time engineering reviews by the DNR have been conducted correctly.

Water Pollution

EPA Regulations on Public Participation

The U.S. EPA decided to combine the public participation provisions of the Clean Water Act, the Resource Conservation and Recovery Act (RCRA), and the Safe Drinking Water Act in one set of regulations. These regulations should be issued in final form in February. In addition, the EPA will issue new regulations for all aspects of implementation of the Clean Water Act. These should be issued about 90 days after the public participation regulations are issued.

CBE commented on the EPA public participation regulations and the new regulations under the Clean Water Act. Our main dis-

agreement with EPA's proposed regulations is that EPA is writing public participation regulations as advisory, not mandatory. CBE believes these regulations should be mandatory.

In our comments, CBE asked EPA to allow the public to participate in any enforcement action brought by any state under any of the three acts. We specifically asked that public participation be mandatory in the National Pollution Discharge Elimination Service (NPDES) permit program being established under the Clean Water Act. We also asked that the Freedom of Information Act be made applicable to state programs created under each act. This would give citizens access to information from agencies involved in pollution control.

Water Quality Criteria for 123 Toxic Substances

Under the terms of a consent decree issued by a federal court (*CBE v. Train*), the U.S. EPA was mandated to develop water quality criteria for 123 toxic substances by June, 1978. In the criteria, EPA must state the maximum concentrations of these toxins in water that are consistent with the protection of human health, aquatic organisms, and the environment.

In March of this year, EPA made public a set of documents containing the water quality criteria they had developed as well as the toxicological data used to support these numbers. CBE staff scientists and outside scientific consultants reviewed these documents and found them to be grossly inadequate. Many important scientific data were omitted from the documents, including information demonstrating the ability of these toxic chemicals to cause cancer, birth defects, mutations, and nerve damage. Many of the criteria numbers developed by EPA were inadequate to protect human health and the environment. As a result of CBE's criticisms, as well as criticism from other environmental groups, feder-

al and state agencies, and scientists. EPA has decided to rewrite these documents and propose new water quality criteria. When these new documents are published early in 1979, CBE will again review them to ensure that all relevant toxicological data have been reviewed and that the water quality criteria established are protective of humans and the environment.

Phosphorus as a Pollutant

CBE submitted a comment to the U.S. EPA explaining why phosphorus must be classified as a conventional pollutant, and thus be subject to permit discharge limitations under the Clean Water Act.

Phosphorus is a nutrient with significant potential impact on water quality and on aquatic life. CBE recommended that EPA establish a standard requiring 90 to 95% removal of soluble ortho-phosphate from all domestic effluent. Municipal treatment plants, except for some which discharge into the Great Lakes, are not now required to remove phosphorus. CBE also recommended that limitations on phosphorus be even more stringent for bodies of water whose water quality is already threatened, especially during critical seasons when algae tend to grow most heavily and when there are releases of natural phosphorus into waterways.

Wisconsin

Public Participation and Water Pollution

The state of Wisconsin has taken the position that it need not and will not provide for citizen participation in any enforcement action taken in its pollution discharge elimination program.

CBE challenged the Wisconsin policy in the Seventh Circuit Court of Appeals. After filing of briefs and oral argument, the court declined to rule on the merits of the case and dismissed the action on technical grounds. CBE immediately initiated a new test case by filing a 60-day notice of intent to sue against the Babcock & Wilcox Company for violations of its water pollution elimination discharge permit. The state of Wisconsin filed suit against the company on the sixtieth day, thereby cutting off CBE's right to sue. CBE then sought to intervene in the state enforcement action, asserting its right to participation.

After briefs and lengthy oral argument in state circuit court, the court denied CBE any citizen participation. CBE has appealed to the Administrator of the U.S. EPA and will bring a new petition for review in the Seventh Circuit Court of Appeals if the Administrator refuses to rectify the defect in the Wisconsin program.

City of Milwaukee Lake Pollution

A federal common law nuisance action, *Illinois v. Milwaukee*, in which CBE participated as a friend of the court, has mandated that Milwaukee institute a very high level of treatment for all sewage discharged into Lake Michigan and also that the city implement a strict construction schedule for upgrading and adding to existing sewage treatment facilities. In addition the state of Wisconsin has entered into a stipulated agreement with the city of Milwaukee to a similar, although less stringent, effect.

Sludge Trucking Program

CBE threatened suit to force the Sewerage Commission to institute and maintain an emergency trucking program to haul solid sludge from its overloaded South Shore Treatment Plant to landfill. This operation was instituted, thus helping to spare the lake from overflows of untreated sewage.

Implementation of EPA Civil Penalty Policy

CBE discovered that the Wisconsin DNR has not been properly applying recently issued U.S. EPA guidelines on civil penalties for unlawful pollution. This policy states that civil penalties should be sufficiently severe so that a polluter will gain no competitive or financial advantage from delaying compliance with legal deadlines for the installation and operation of BACT.

CBE has argued vigorously to the DNR that the interests of our members are inadequately represented by the state because of its failure to apply the EPA's Civil Penalty Policy. CBE will prosecute its objections with the U.S. EPA Civil Penalty Review Panel, to bring Wisconsin into line with national policy.

Notice of Public Hearings

The Wisconsin DNR has failed to provide 30-day notices of public hearings, as required by federal regulations, on renewals of pollution discharge permits. CBE met with personnel from the DNR to protest this failure. The DNR agreed to provide such notice and also agreed to procedures that will allow the public to obtain information from DNR files before public hearings. CBE has found that adequate notice and access to DNR files are essential for public participation in the permit granting process.

Moss-American Case

When the U.S. government sued the Moss-American Company for pollution of the Little Menomonee River with creosote, the federal district court dismissed the charges against Moss-American because a U.S. EPA scientist had falsified a test sample. CBE believes that the court's decision was legally incorrect. A polluter should not be excused of all liability because a government employee has acted improperly.

The Justice Department did not appeal the decision, however, and CBE wrote to the department requesting an explanation. We believe that this precedent should not remain unchallenged.

Illinois

Public Participation and Water Pollution

When Illinois assumed control of the state water pollution control program from the U.S. EPA, the state provided for substantial but not total public participation. CBE was concerned, however, that these provisions do not sufficiently protect the public's rights and that industry might intervene in the Illinois legislature to remove avenues of public participation in enforcement actions.

CBE challenged the Administrator of the U.S. EPA for having approved the Illinois water program without requiring mandatory public participation. The Seventh Circuit Court of Appeals ruled in CBE's favor in January, 1979—the first time a state program has been overturned by a court. This case will serve as a precedent to use in challenging the public participation program that EPA will promulgate in February.

Fox River Industrial Polluters

CBE identified three companies discharging into the Fox River in Illinois in violation of their permits. As a result two of the companies were brought into compliance in 1977, but the third, Modine Manufacturing, has still not been the object of an enforcement action. After control of the state water pollution control program was transferred to the Illinois EPA, CBE began pressuring that agency to take action. Modine refuses to install any more pollution control equipment voluntarily.

It is not clear whether the Illinois EPA will take action against Modine, and CBE may have to sue the company directly.

Outboard Marine Pollution of Lake Michigan

Outboard Marine Company of Waukegan, Illinois, apparently has discharged about eight million pounds of polychlorinated biphenyls (PCBs) into waterways, including Lake Michigan. The U.S. EPA filed an action against Outboard Marine to prevent future discharges and to force the company to clean the PCBs from Waukegan Harbor and from Lake Michigan sediment. CBE entered this case as an agent to encourage the Illinois EPA either to join the suit or to initiate another one in state court. We have negotiated with Illinois EPA, but the agency has not yet stepped into the case.

California

Ocean Discharge of Sewage

During the course of the year, CBE submitted detailed comments and expanded comments to the U.S. EPA on proposed regulations. These regulations would permit coastal cities to obtain exemptions from the federal requirement that their publicly owned sewage treat-

ment works achieve secondary treatment of wastewater before discharging into the ocean. In September, the EPA released preliminary final regulations. CBE was fairly pleased with the toughness of the EPA regulations, but we continue to oppose granting of exemptions along the West Coast.

San Francisco Sewage Treatment Project

San Francisco is currently rebuilding its antiquated sewage treatment system. The $1.5 billion project — the largest public works project in the city's history — will nearly eliminate ten billion gallons of untreated sewage which now contaminate the Bay and ocean each year. San Francisco beaches are now closed for public use about one-third of the year because of sewage overflows.

Many components of the project are still in the planning stages, and CBE is pressing city decisionmakers to favor construction of the most environmentally sound system over less expensive, but inadequate, alternatives. CBE is participating in the Citizens Advisory Committee for the project, which meets monthly and testified in November before the Regional Water Quality Board against a relaxation of water pollution abatement guidelines. The board's decision is expected in 1979.

Toxic Substances

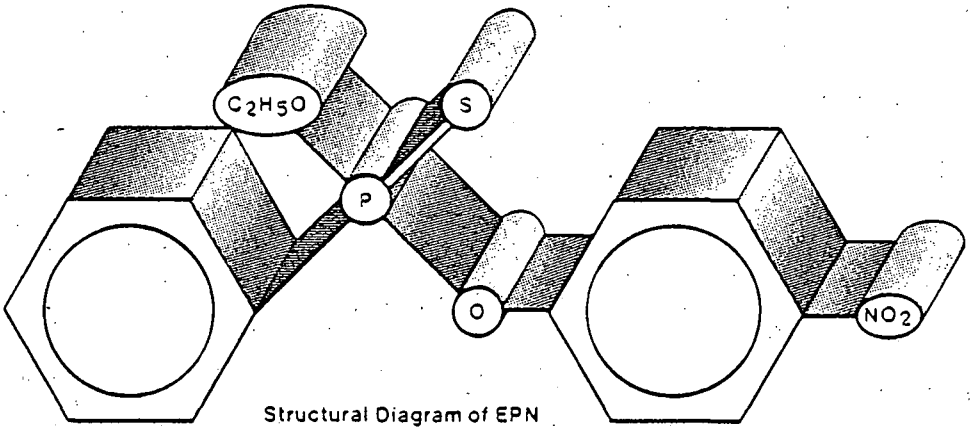
Cadmium Hazards in Agricultural use of Sludge Fertilizers

Large quantities of toxic chemicals are discharged, primarily by industry, into municipal sewage treatment plants. As a result, the residue, or sludge, produced by these plants is contaminated with such toxins as cadmium, lead, and chlorinated organics.

A study completed by CBE this year demonstrated that the application of highly contaminated sludge, as a fertilizer, to land used to grow food crops can result in serious human health problems. Crops grown on sludge-treated soil can absorb many of the toxic chemicals in sludge; the toxins thus enter the human diet.

Cadmium, a metal found in high concentrations in Milwaukee and Chicago sludge, is not only absorbed by crops but is also concentrated in plant tissue. This metal has been shown to cause cancer, birth defects, and kidney damage. As a result, it has been singled out by the Food and Drug Administration as one of the metals of greatest concern in our food supply.

CBE prepared detailed comments on the U.S. EPA's proposals for disposal of sewage sludge, which were issued in February of this year. We concluded that adoption of the EPA regulations as written would permit the entry of unsafe levels of toxins, especially cadmium, into the food chain. CBE requested that EPA prohibit the use of sludge on agricultural soil and, instead, encourage its use on land not used to grow food — forests and parks, strip-mined land, and sod farms.



Structural Diagram of EPN

Sludge Fertilizer Reports

Since 1974 the Metropolitan Sanitary District of Chicago (MSD) has made available free to the public a sludge called Nu-Earth. Since 1926, the Milwaukee Sewerage Commission has sold tons of sludge throughout the country under the name Milorganite. Both of these sludges have been used by homeowners to fertilize and condition their gardens and lawns.

This year CBE prepared lengthy scientific reports documenting the health hazards inherent in the use of these highly contaminated sludges on gardens. We presented these reports to the Chicago MSD and the Milwaukee Sewerage Commission to support our contention that both the Nu-Earth and the Milorganite programs should be discontinued. We also held a press conference to warn the public of the danger of using these sludges on gardens.

As a result of CBE's report, the Milwaukee Sewerage Commission decided to place a warning on Milorganite bags. The Chicago MSD has stopped supplying local distribution sites with Nu-Earth; the sludge can be picked up only by the truckload by persons who sign forms stating they will not use it on their gardens.

Suit on Hazardous Waste Regulations

RCRA required the U.S. EPA to promulgate regulations defining and controlling hazardous wastes. Although the deadline for promulgating these regulations was April, 1978, no regulations have been promulgated.

In September CBE, along with two Washington-based environmental groups and the State of Illinois, filed suit against the EPA in federal court in the District of Columbia. Judge Gerhard Gesell issued a partial summary judgment in our favor.

CBE was the only plaintiff that raised the issue of regulation of sewage sludge as a hazardous waste, which will be argued in January, 1979. Also still at issue are the deadlines EPA must meet in promulgating regulations. CBE is negotiating with EPA and the other parties on the schedule. We expect the court to make a decision in January.

Control of Hazardous Wastes Under RCRA

In October, CBE presented testimony before the U.S. House of Representatives Subcommittee on Oversight and Investigations concerning the U.S. EPA draft regulations for the definition and control of hazardous wastes under RCRA. CBE testified that the criteria used by EPA to define a waste as hazardous are inadequate. Many pesticides and toxic organic wastes will not be included under EPA's definition of hazardous wastes, and thus they will not be managed so as to protect human health and the environment. In addition, EPA's draft proposal for regulating those wastes that are defined as hazardous is not strong enough to prevent the entry of toxins into the air we breathe and the water we drink. CBE concluded that, unless EPA's draft regulations are strengthened, disasters like those that took place at Love Canal, New York, and in Toone, Tennessee, will occur again.

Alternative Pest Control Strategies for the Midwest

The U.S. currently relies almost exclusively on synthetic chemical pesticides for the control of insects. In the Midwest alone, thousands of pounds of toxic chemicals are introduced into the environment each year for purposes of pest control. Little is known, however, about the chronic effects these pesticides may have on producers and applicators, the effect of harmful residues that may remain on foods and be ingested by consumers, or the movement of these chemicals in the environment and thus their effect on aquatic and terrestrial flora and fauna. Many pests are becoming resistant to the chemicals being used to control them, so that sprayings and doses of pesticides must be increased each year.

CBE is researching alternative control measures for the control of pests in corn, soybeans, alfalfa, and grains so that we can present these alternatives to growers in the six midwestern states that compose the U.S. EPA's Region V.

Alternative Pest Control Strategies in the Corn/Soybean Region

Various federal agencies and committees are concerned about the widespread contamination of the biosphere with synthetic organic pesticides, especially the highly persistent organochlorine insecticides. The OTA has been commissioned by the Senate Committee on Agriculture, Food, and Nutrition to study the future of alternative pest control strategies over the next ten to 15 years. CBE has been appointed to a panel of the OTA, to assess future pest control strategies in the corn and soybean region of the United States. The OTA will produce and submit to Congress a document giving its judgment of the future of pest management in this country.

Toxic Substances Control Act

The U.S. EPA seems not to appreciate the need for prompt implementation of TOSCA. Although Congress intended TOSCA to regulate human exposure to chemicals "from the cradle to the grave," the EPA seems not to have received the Congressional message.

During 1978 CBE participated in numerous hearings and informal meetings on the implementation of TOSCA.

Initial Report of the Interagency Testing Committee

In January, 1978, CBE commented on the selection of chemicals for further testing by the Interagency Testing Committee. At that time the committee had recommended for testing four individual chemicals and six classes of chemicals. The recommendations were made on the basis of production volume, exposure, and structure-activity correlations. The testing recommended for these substances was primarily directed toward determining their adverse human health effects.

CBE suggested that chemicals be tested for their impact on the environment as well as for adverse human health effects. We suggested that testing be conducted on impurities, byproducts, and contaminants of these substances as well as the substances proper. We suggested that manufacturers be required to submit all health and safety data in their possession to the agency. Finally, we recommended that the agency issue testing rules as soon as possible so that these substances can be tested.

Unfortunately, the agency has deferred promulgation of testing rules, so the testing recommended by the committee probably will not be performed this year.

Premanufacture Notification Under TOSCA

CBE gave a formal presentation before the Toxic Substances Advisory Committee of the U.S. EPA on the anticipated guidelines for testing new chemical substances under Section 5 of TOSCA. CBE recommended that the Office of Toxic Substances strengthen its guidelines for testing new chemical substances so as to take into consideration potential harmful effects on the environment as well as human health effects. We also presented a detailed critique of the agency's testing package. The agency has now decided to "decouple" testing requirements from the notification requirements for new chemical substances. This decision means that for the next few years no formal testing will be required for any new chemical substances or classes of substances.

Carcinogen Policy Work Group

CBE is represented on the U.S. EPA's Carcinogen Policy Work Group. This group of scientists is reviewing EPA's policy for eliminating cancer-causing agents from the environment. It is also trying to render EPA's policy consistent with the cancer prevention policies of other government agencies such as the Occupational Safety and Health Administration and the Food and Drug Administration. The work group has held several meetings in Washington and New York and will be issuing a preliminary report during the spring of 1979.

Toxic Substances Advisory Committee

CBE is one of two environmental groups represented on the 16-member Toxic Substances Advisory Committee, which advises the Administrator of the U.S. EPA on policy and regulations relating to the environmental, economic, and social aspects of implementing TOSCA. The Committee is playing an important role in shaping the form of new regulations for the chemical and petrochemical industries, and held six meetings in Washington during 1978.

Illinois

Sludge Use on Agricultural Land

In April, 1977, the Illinois EPA made public proposed regulations governing the use of sludge on agricultural land. Since that time, there have been three hearings before the Illinois PCB. Both CBE and the Chicago MSD, which generates thousands of pounds of sludge every year, submitted comments. The MSD sought to have regulations weakened, while CBE insisted that they be strengthened in order to protect the public health. CBE based its recommendations on a report, issued by CBE, summarizing the relevant scientific data and showing that toxic materials in sludge, especially cadmium, can be absorbed by food crops grown on sludge-fertilized land. These toxins then enter the human diet.

No further hearings will be held until the U.S. EPA publishes its sludge disposal regulations in 1979.

Long-Term Effects of the Pesticide EPN

In August, 1978, there was an explosion at a Stauffer Chemical Company plant in Chicago Heights, Illinois. As a result 2,500 gallons of a pesticide called EPN were released, along with several other toxic chemicals. Rescue workers and journalists were heavily exposed, and the surrounding community may have been exposed to airborne material.

According to information obtained by CBE under the Freedom of Information Act, exposure to EPN can cause delayed nerve damage, even crippling. The long-term effects of EPN are irreversible.

Following the Stauffer explosion, CBE gave an exclusive interview to the NBC-affiliate station in Chicago about the threat to human health from EPN exposure. The story was carried in local newspapers, on local radio and television, and in the Washington Post. The wire service story, carried by the Associated Press, was published as far away as Wyoming.

CBE is exploring numerous channels in an attempt to see if funds can be obtained to evaluate the human health effects that may result from that exposure.

Nuclear Waste Dump at Sheffield, Illinois

Since 1967, Nuclear Engineering Company (NECO) has buried low-level radioactive wastes in trenches at a site near Sheffield, Illinois. In late 1977 it was revealed that radioactive tritium is leaking from this site, and that the Nuclear Regulatory Commission (NRC) had allowed NECO to operate the site for nine years on an expired license. The Illinois Attorney General sued NECO and the NRC, asking for an environmental impact statement, a halt to dumping at Sheffield, and public hearings on whether dumping should be allowed to continue at the site. CBE intervened in that suit in support of the Attorney General. Meanwhile, NECO filled all the licensed trenches at the Sheffield site and asked the NRC for permission to expand the site.

Thanks to the intervention of the Attorney General and CBE, the NRC has not allowed NECO to expand the Sheffield site, and dumping of nuclear wastes there has ceased. An environmental impact statement is being prepared, and public hearings are expected in early 1979.

Radioactive Waste in West Chicago

Radioactive thorium was processed at a plant in a residential area of West Chicago for 40 years starting in the 1930s. The radioactive waste produced was partially dumped at the plant site, while some of it was dumped at a site that has since become a public park. In all, about 70 sites containing radioactive materials were found around the city of West Chicago.

The NRC, after considerable prodding from the mayor and citizens of West Chicago, required Kerr McGee Corporation, which owns the plant, to devise a plan for cleaning it up. CBE participated in negotiations between the NRC and Kerr McGee and will review the Kerr McGee plan when it is presented to the NRC, which should be by December 31, 1978.

California

DBCP

After the revelation that exposure to the pesticide DBCP resulted in decreased sperm count and sterility in California workers, the state of California instituted a temporary ban on the use and production of that pesticide. The California Department of Food and Agriculture (DFA) held hearings in the fall, 1978, on whether this ban should be continued. Meanwhile, the U.S. EPA decided that DBCP should be registered for use on certain products.

CBE testified at the California DFA hearings on DBCP, contending that reregistration of DBCP "would be premature and hasty in light of its demonstrated toxicity." In November the state of California opted to continue the ban on DBCP.

CBE is collaborating with California Rural Legal Assistance on a petition for a hearing before EPA on that agency's decision to continue the registration of DBCP.

Wisconsin

Town of Cedarburg and 2,4,5-T

CBE testified at a public meeting in August and convinced officials of the town of Cedarburg to suspend a controversial weed-control program using the herbicide 2,4,5-T on town rights-of-way. CBE cooperated with a local citizens' group that had been hastily organized in opposition to the spraying program. We presented U.S. EPA findings on the toxicity of 2,4,5-T and its dioxin contaminants.

Energy Policy

Nuclear Evacuation Plan Study

CBE produced a study of federal, state, and local plans that have been devised to protect the public in case of an accident, with release of radioactivity, at a nuclear power plant; we also examined the actual events that have transpired during drills and in a few cases in which nuclear plants have actually suffered minor accidents.

Our study reveals that federal agencies have been unwilling to take responsibility for nuclear disaster planning, each agency assigning responsibility for this planning to another agency, so that no agency is actually responsible. Only a handful of states have federally approved plans, and drills have shown that those plans that have been tested contained major flaws.

The CBE report received prominent national media coverage. President Carter asked for copies and, a month after he received the report, announced a total reorganization of all federal emergency services.

Nuclear Waste Policy Review

This year federal agencies have stepped up their efforts to find a permanent solution to the problem of disposing of high-level radioactive wastes. The agencies have also become more responsive to information and suggestions from citizen organizations.

At the request of the Department of Energy (DOE), CBE attended a briefing in Washington at which the Interagency Review Group on Nuclear Waste Management draft report was released. CBE later released a lengthy, critical comment on this report.

Solar Information Clearinghouse

Because of our expertise on solar energy systems, CBE is frequently asked to perform a variety of informational functions about solar, wind, biomass conversion, and other solar-based energy systems. CBE is currently reviewing 37 proposals on appropriate technology systems submitted to the DOE. CBE has been an invited participant in numerous government-sponsored workshops on solar policy, and has also provided speakers to professional societies and groups of financial decision-makers who seek further information on the potential of solar energy.

Mid-American Solar Energy Corporation

DOE recently created four regional centers in the United States to promote the commercialization of solar energy. These centers will fund demonstration projects, identify potential legislation and other incentives to encourage the development of solar applications.

The Mid-American Solar Energy Corporation (MASEC) includes the 12 midwestern states. Each state is represented by one director appointed to the MASEC board.

CBE was appointed by Governor James R. Thompson to represent Illinois; CBE met with a 120-member advisory committee twice in Springfield during 1978. There have been two MASEC board meetings in Minneapolis, and CBE went to Washington twice to meet with the Assistant Administrator for Solar Energy and the General Counsel of DOE concerning MASEC programs and funding.

Federal Coal-Leasing Policy

CBE filed a comment criticizing the final environmental impact statement prepared on a proposed federal program which would lease out more public land for coal development. CBE contends that the environmental impact statement does not demonstrate a need for any additional coal leasing in this century and contains flaws which allow gross mismanagement of public resources — which has afflicted public coal leasing since its inception in 1920 — to continue unchecked.

Federal Coal-Leasing — II

CBE Research Director Jim Cannon completed a book-length study of federal, state, and Indian coal-leasing policies, called *Mine Control*, which was published this year. He also received a consulting contract from the OTA to act as a technical advisor to an OTA project examining the status of the federal coal leasing program and the implementation of the 1976 Federal Coal Leasing Amendments Act. The project will continue through 1979. He performed a 30-day consulting assignment for the U.S. Department of the Interior concerning state coal land leasing programs in the West.

California

Solar Information Service

This year CBE started a solar information center for the Bay Area. This office established a solar "hotline" number (415—777-1987) which people can call for referrals to businesses providing solar services. More than 150 such companies are now on file. In addition, CBE coordinated Sun Day and Energy Week activities in the Bay Area.

California and Coal

California is at the crossroads in deciding its energy future. Nuclear power plants have been defeated or at least deferred by the Brown Administration. There is a strong movement in favor of rapid implementation of alternative energy technologies, but these efforts have been opposed by major utilities. The utilities are turning to coal — which, although it is a fuel new to California, is similar to nuclear power in that it relies on a limited resource, is centralized, is complex, and is capital intensive.

During the year CBE attended conferences on coal in California and prepared numerous papers and comments on this subject. CBE was also appointed to the Energy Advisory Committee of the Department of Water Resources, the purpose of which is to advise the DWR on the acceptability of its plans to employ coal and to rate proposed sites for power plants if they are built.

PG&E Fossil I and II

Pacific Gas & Electric Company (PG&E) announced early in 1978 its intention to build a 1,600 Megawatt coal-fired power plant at one of four sites, three of which are in the Central Valley of California — one of the prime agricultural regions in the world. The plant would have a major environmental impact if built, both at the site of coal mining in Utah and at the site of combustion in California.

CBE was the first major environmental group in California publicly to oppose the coal-fired plant. During the course of the year, CBE testified at hearings about the plant and produced our 20,000-word report for the OTA on the adverse effects of sulfur pollutants on agriculture. By the end of the year, the California Energy Commission issued its preliminary report on the proposed PG&E plant. The commission criticized the three proposed sites for the plant that were in the Central Valley, citing in its report CBE data on the impact the plant would have on agriculture if it was built there.

However, the commission recommended

that the plant be sited near San Francisco. CBE believes that building a plant there would place an unnecessary burden on the Bay Area's already poor air quality. We will also continue to argue our case that coal is an unnecessary and inappropriate energy source for California.

Illinois

Commonwealth Edison Rate Increase Request

CBE intervened in an Illinois Commerce Commission (ICC) hearing on Commonwealth Edison's 1978 request for a $125 million (5.6%) rate increase. Edison claimed that inflation and regulatory lag had resulted in lower than acceptable returns. CBE research indicated, however, that Edison's mismanagement of plant construction is the main reason for the utility's low earnings, rather than inflation. We showed that the utility maintains generating capacity more than twice its stated goal of 14% and that this figure could rise to 40% in the next decade.

On December 13, 1978, the ICC granted Edison only a 3.1% rate increase and ordered a formal investigation into Edison's construction activities to determine whether the utility is maintaining more generating capacity than is required reliability to meet customer demand.

Illinois Commerce Commission Load Forecasting Investigation

This year CBE continued its participation in an ICC proceeding to investigate load forecasting methods used by six major Illinois utilities. CBE's studies reveal that unnecessary power plants have been built because of utility's exaggerated predictions of electrical demand.

Hearings have been held at irregular intervals throughout the year. CBE staff members were on hand to cross examine utility witnesses. The final decisions of the commission is expected in June, 1979.

The "Pass Through" Provision for Utility Fuel Costs

Utilities in Illinois are permitted to "pass through" increases in fuel costs to consumers in the form of higher electrical rates without regulatory review. A major reason for higher fuel costs has been the switch to low-sulfur coal to meet sulfur-dioxide standards in metropolitan areas. Illinois utilities have bought low-sulfur coal from the western states without adequately investigating other sources in central Appalachia.

This year the ICC instituted an investigation into the use of the automatic fuel adjustment clause by electric utilities. CBE presented expert testimony at these hearings and made recommendations to the commission for the reform of present regulatory policies. We believe that utility fuel procurement policies should be investigated periodically in order to ensure that power companies use the least expensive fuels available consistent with environmental regulations.

Shipments of Spent Nuclear Fuel

When Commonwealth Edison requested permission from the NRC to ship spent nuclear fuel between the Dresden and Quad Cities reactors in Illinois, CBE and the Natural Resources Defense Council (NRDC) intervened in the NRC proceedings.

CBE and NRDC contend that shipment of spent fuel between these two reactors is unnecessary and would increase exposure of workers to radiation. It would also violate the National Environmental Protection Act, which requires that an environmental impact statement be prepared before a major action such as the proposed shipments can be undertaken.

Wisconsin

Partial Moratorium on Further Nuclear Construction

The Wisconsin Power Plant Siting Act requires major electric utilities to file plans with the Wisconsin PSC every two years so that the PSC can review the location and types of proposed power plants and determine whether the utilities' plans will be the best solutions to the state's needs. CBE actively participated in the hearings over a period of a year and a half, emphasizing the need for a comprehensive Wisconsin energy policy using fossil fuels only as "transitional fuels" allowing for rapid development of renewable energy. CBE presented two days of testimony on the poor reliability of nuclear plants and showed that the cost of electricity from two 900 Megawatt nuclear plants would be 25% more than the cost of the same amount of electricity from coal-fired plants. CBE also testified on the potential for sabotage at nuclear reactors.

The PSC's final decision was that coal-fired power generation is economically superior to nuclear power generation. The PSC stated that no nuclear power plants should be planned or applied for in Wisconsin, except for Haven Unit I and Tyrone Unit I, until reasonable progress has been made in resolving the waste disposal, fuel supply, and decommissioning problems associated with nuclear power.

WEPCO Rate Increase Request

CBE is participating in a Wisconsin PSC hearing on WEPCO's request for a $68.5 million (11.5%) rate increase. The main reason for this request is WEPCO's stepped-up power plant construction program, which calls for expenditures of $1.3 billion from 1978 to 1982.

WEPCO had asked for immediate interim relief of $17 million. The PSC denied the interim request when CBE demonstrated that WEPCO is in excellent financial condition. A final decision by the PSC on the rate hike is expected by February.

Utility Accounting Practices Challenged

A utility must raise capital to finance power plant construction in progress. When construction work in progress (CWIP) is included in the rate base, the cost of acquiring capital for construction is collected from the rate payers. If CWIP is not included in the rate base, rate payers reimburse the utility for the cost of raising capital when the power plant begins operation.

In its petition to the Wisconsin PSC, CBE established that total cost to rate payers is less if CWIP is not included in the rate base. Currently, Wisconsin rate payers are forced to pay returns on CWIP; they have become involuntary investors yet they receive no return on their investment. CBE has determined that a proposed rate hike would require rate payers to pay returns of $33 million on power plants which are still in construction and thus not providing the rate payers with service.

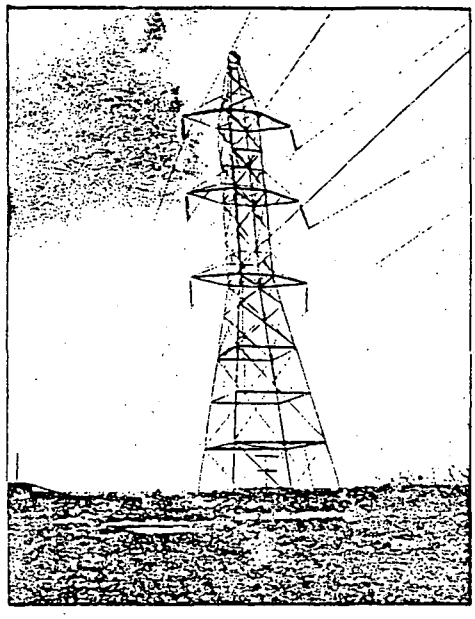
If Wisconsin utilities are not allowed to include CWIP in their rate base, they will have to decide whether to build additional power plants at their own risk rather than at the ratepayers' risk. Eliminating CWIP from the rate base will provide the utilities with an incentive to improve efficiency and will help to keep rates and power plant construction at appropriate levels.

The Wisconsin PSC has decided to investigate the practice of including CWIP in the rate base, and hearings are expected to begin in the spring of 1979.

Suit to Stop Promotion of Electrical Space Heating

Wisconsin utilities have been setting electric rates low in the winter, thus promoting the use of electrical space heating. In 1977, CBE and

(Continued on back page.)



citizens for a better environment
Suite 502/536 W. Wisconsin/Milwaukee, Wisconsin 53203
Main Office: Suite 2610/59 E. Van Buren/Chicago, Illinois 60605

Wisconsin's Environmental Decade sued the Wisconsin PSC to change the rate design. We charged that high winter consumption of electricity would require utilities to build expensive electric generating plants; these would be under-used in the warmer months. We sought to show that rate designs that encourage conservation result in less expensive electricity and increased employment, in energy conservation programs.

The Circuit Court of Dane County ruled that judicial review of the PSC policy is not necessary; the case was appealed to the Wisconsin Supreme Court, and a decision is expected in early 1979.

Time-of-Day Rates in Wisconsin

When the Wisconsin PSC issued an order allowing WEPCO to implement time-of-day rates, CBE and Wisconsin's Environmental Decade sued the PSC. Electric rates which vary according to the time of day have been looked to recently as a way of leveling peaks in energy demand. This would free utilities from having to build large numbers of power plants to meet peaks in energy demand. But low off-peak rates may make electricity competitive with oil and gas, thus encouraging energy consumers not now using electricity to convert. Because off-peak electricity is so inexpensive, important alternative energy sources such as solar heating may be greatly retarded. Thus time-of-day pricing may encourage energy waste rather than energy conservation.

CBE, Wisconsin's Environmental Decade, and Milwaukee-area legislators and labor unions filed a petition for review of the PSC order in Dane County Circuit Court. We stated that the environmental impact statement submitted by the PSC had not adequately described the environmental impact of time-of-day pricing, as required by the Wisconsin Environmental Policy Act.

New Executive Director and President for CBE

The CBE staff is stunned and greatly saddened by the loss of our President and Executive Director, David Comey. We wish to thank the many people who wrote letters of condolence and encouragement to us and to Mr. Comey's family.

CBE's Board of Directors met on January 12, 1979, and made the following appointments: James Cannon, former Research Director for CBE's California program, has been appointed Executive Director. Larry Hoellwarth, former CBE Vice President and Director of Development, has been appointed President.

One of the last projects to cross David Comey's desk was the CBE Annual Report for 1978. The annual report comprises the whole of this special issue of the *CBE Environmental Review*, which will serve for two months, February and March. It is dedicated to his memory.

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Offices:

BERKELEY:	Suite 404 2131 University Avenue Berkeley, California 94704 415—549-3900
CHICAGO:	Suite 2610 59 East Van Buren Chicago, Illinois 60605 312—939-1984 (Research: 312—939-1530)
MADISON:	2 West Mifflin Madison, Wisconsin 53703 608—251-2804
MILWAUKEE:	Suite 502 536 West Wisconsin Avenue Milwaukee, Wisconsin 53203 414—271-7475
NEW YORK:	Suite 425 25 Broad Street New York, New York 10004 212—425-3553
SAN FRANCISCO:	Suite 600 88 First Street San Francisco, California 94105 415—777-1984
WASHINGTON:	Suite 200 1341 G Street, N.W. Washington, D.C. 20005 202—347-1132

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Art Director: Ken Arway
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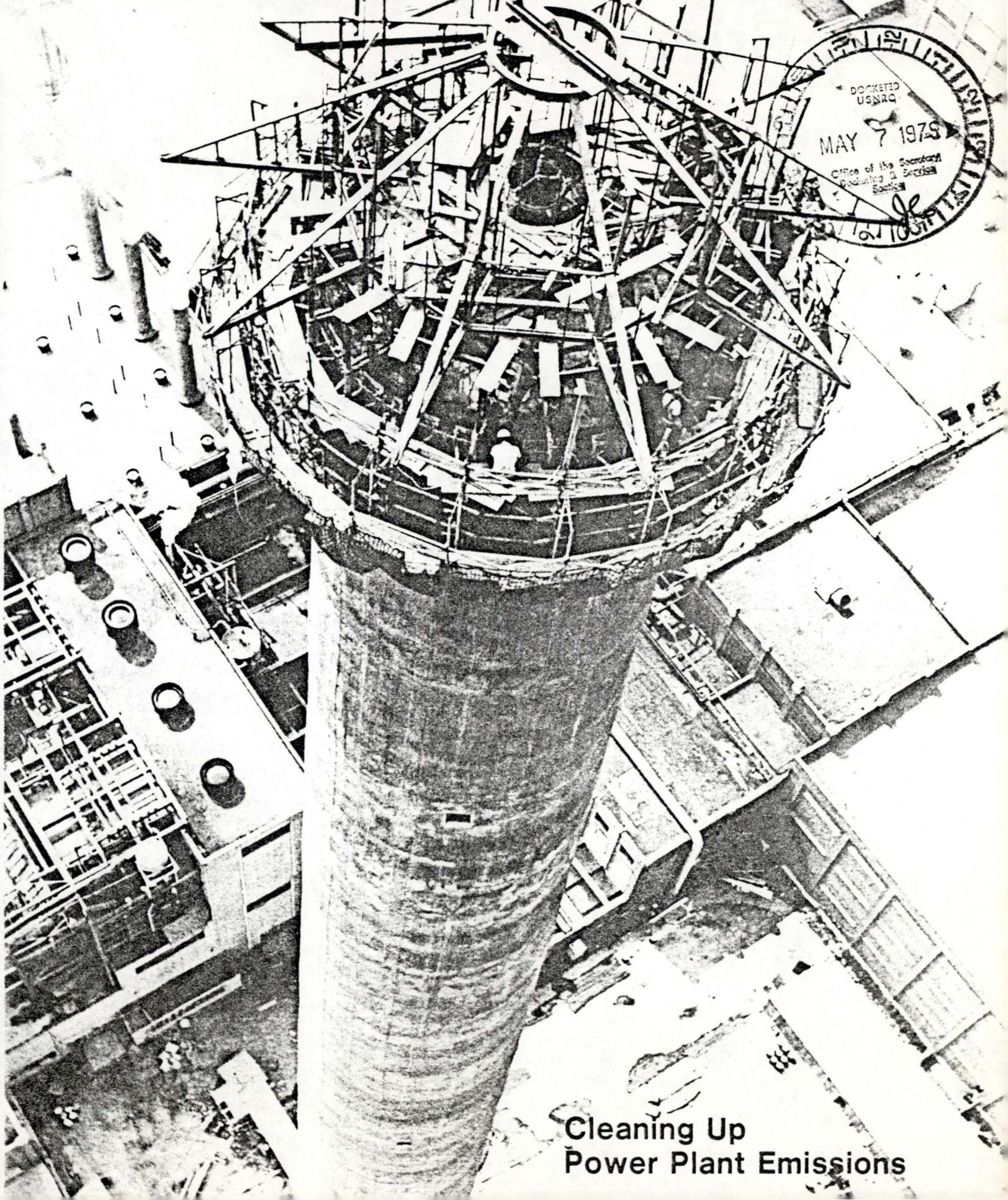

Cleaning Up Power Plant Emissions

CBE Briefs

National

Energy Policy

Nuclear Conference

CBE attended a two-day conference on nuclear energy and weaponry held in Columbia, Maryland, on September 19-20. The conference brought together representatives of more than 40 environmental, disarmament and public interest groups in order to discuss the current status of the civilian nuclear power industry and the nuclear weapons proliferation problem.

Among those attending were Arlie Schardt (Environmental Defense Fund), Samuel Day *(Bulletin of the Atomic Scientists)*, Charles Komanoff, Heather Booth (Midwest Academy), Alvin Duskin (Pacific Alliance), David Jhirard (Union of Concerned Scientists), Alan McGowan (Scientists Institute for Public Information), and Harvey Wasserman (Clamshell Alliance).

The conference, sponsored by Maryanne Mott Meynet, came up with a number of strategies for combatting nuclear proliferation and converting from nuclear power to renewable energy systems such as solar power.

Toxic Substances

TOSCA Advisory Committee

CBE's executive director, David Comey, has been appointed to a three-year term on the newly formed Toxic Substances Advisory Committee of the U.S. Environmental Protection Agency.

The Committee will advise the Administrator of the US EPA on policy and regulations relating to the environmental, economic, and social aspects of the implementation of the new Toxic Substances Control Act. The Committee can also recommend studies for EPA to do.

Because the Act leaves much of the regulatory powers up to the discretion of the Administrator rather than spelling them out in detail, the Committee is expected to play an important role in determining how tough the regulations will be.

The 16 members of the panel include representatives from such chemical companies as DuPont and Eastman Kodak, as well as independent health experts such as Dr. Irving Selikoff of the Mount Sinai School of Medicine in New York, and Dr. Edward Radford of the University of Pittsburgh.

CBE was one of two environmental organizations named to the Committee; the other was the Conservation Foundation of Washington, D.C.

TOSCA Inventory Meeting

On August 24, 1977, CBE attended a public meeting in Washington, D.C., to state our viewpoint on the reproposed inventory reporting requirements for the implementation of the Toxic Substances Control Act (TOSCA) by the EPA. CBE's position is that, for the initial inventory of chemical substances in commerce, all manufacturers be required to report not only the specific chemical substances they produce but also their production volumes. Additionally, we proposed that small manufacturers be defined as having only one plant site and a production volume of 2,000 pounds or less. For the second phase of reporting under TOSCA, CBE proposed that all manufacturers and processors of chemical substances be required to report:

1) The category or proposed category of use of each substance or mixture.

2) A description of the byproducts and impurities for any chemical substance.

3) A description of the mode and amount of both human and environmental exposures to any chemical substance.

4) The inclusion of all existing data concerning the environmental and health effects of such chemical substances and mixtures.

Illinois

Energy Policy

Edison Rate Hike

On September 14, CBE presented testimony before the Illinois Commerce Commission (ICC) concerning Commonwealth Edison's request for a $263 million rate increase. The testimony culminates eight months of hearings which will determine whether Edison should be granted the increase. CBE's Director of Utility Research David Stahr recommended reforms which would end a number of inflationary company policies.

It surfaced in the hearings that money from higher electric rates will be used to cover the cost of maintaining unnecessary generating capacity through the year 1983. CBE requested that the Commission eliminate excess generating capacity and construction work in progress from the company's rate base.

CBE opposed Edison's proposed rate structures and instead recommended that electric rates be based on actual costs which would encourage conservation and reduce the need for additional power plants.

CBE also asked the ICC to initiate a public investigation of the risks and costs involved in Edison's nuclear expansion program. Edison's present construction plans call for relying heavily on nuclear generated electricity in the 1980's.

The ICC decision on Edison's rate increase request will be issued by October 19,1977.

Unplanned Unparenthood

by Eileen Choffnes

It started out harmlessly enough. The men at the Occidental Chemical Company were taking their noon lunch break and talking among themselves. One of the topics of conversation was the fact that there weren't many children being born among them. This seemed rather strange since none of the couples were using birth control methods. They were young and in apparently good health. Some of these men had had children prior to working at Occidental, yet since that time many of the men were having no success at all in fathering children. The story that was about to unfold was to have far-reaching repercussions not only to the workers at Occidental but to the public at large.

One topic of conversation among the workers was that they were having trouble fathering children.

In November, 1975, Ted Bricker, a worker at the Occidental Chemical Company facility at Lathrop, California went to his company doctor for the treatment of organophosphate poisoning. During the course of his treatment, the physician performed a sperm count test on him. The results of that test showed that he was completely sterile — a fact confirmed through periodic testing over the next six months.

Over the next few months, many of the workers became aware, through talking among themselves that many of them were having trouble fathering children. It soon became apparent that many of the workers shared a common problem. Only after laboratory tests of these men was it discovered that many of them were either partially or completely sterile.

How did such a thing happen to so many men? The workers found to be sterile at Occidental worked in a section of the plant which produced DBCP, (1,2-dibromo-3-chloropropane). Could this chemical substance have been responsible for their sterility? And if so, what other effects could DBCP have on persons exposed to it — could it cause cancer?

DBCP is widely used as a soil fumigant against wormlike pests known as nematodes. The major manufacturers of DBCP in this country are Dow Chemical Company, Shell Chemical Company, and Michigan Chemical Company. Among these three chemical producers as much as 30 million pounds of DBCP are manufactured annually. Approximately 75 plants in various parts of the country have been purchasing this chemical and blending it with other materials to manufacture pesticides. One of these plants was the Occidental plant in California.

DBCP is a dense yellow or amber liquid with a very pungent odor. It is produced as an emulsifiable and non-emulsifiable concentrate, as a liquid, a solid, and also in granular form. Some of the trade names that DBCP is sold under are: Fumazome and Nemafume (Dow Chemical Company); Nemagon, Nemaset, BBC 12, and OS 1879 (Shell Chemical Company). There are at least 56 different products which contain DBCP in some amount.

Dibromochloropropane is used on a variety of crops including cotton, soybeans, fruits, nuts, vegetables, and ornamental plants. Depending on the plant's tolerance to DBCP, applications can be made prior to planting, at the time of planting, or after planting a particular crop.

As early as 1954, Dow and Shell Chemical Company were aware that DBCP caused sterility in laboratory animals. Toxicology studies sponsored by Dow and Shell in 1961, showed testicular damage and reduced sperm production in guinea pigs, rats, rabbits, and monkeys exposed to 12 ppm (parts per million) of DBCP for 10 to 13 weeks, as well as other adverse effects in rats, such as acute central nervous system depression and kidney damage at slightly higher concentrations. Even at 5 ppm (the lowest level tested), animals that inhaled DBCP vapors suffered damage to various tissues including sperm cells. A study conducted in 1973 by the National Cancer Institute detected a high incidence of stomach cancer in rats and mice fed DBCP as early as 10 weeks after the study was initiated. Additionally, DBCP was shown to cause mammary tumors in female rats.

Laboratory tests showed many of them were either partially or completely sterile.

While sterility and a potential carcinogenic risk appear to be the most important health effects associated with exposure to DBCP, animal studies and human experience have revealed a variety of other acute and chronic toxic effects of skin contact, inhalation, and ingestion. DBCP exposure will result in irritation of the eyes and respiratory passages. The central nervous system is depressed causing apathy, sluggishness, and anoxia (lack of oxygen to the red blood cells).

Upon short exposures the skin can become slightly irritated. Repeated exposures cause the skin cells to die. Toxic amounts of DBCP can be absorbed through the skin. Excessive exposure to DBCP vapors will result in damage to the liver, kidneys, and various tissues including the skin, lung passages, lens and cornea, and the digestive system. These injuries are typically slow to heal.[1]

Clearly, the Dow and Shell chemical Companies were well aware of the adverse health effects which DBCP had upon experimental animals, yet for some reason they chose to withold this information from the persons who would come in contact with this poison. As a result of their combined negligence, these two companies have put untold hundreds, if not thousands, of persons in danger of becoming sterile or developing cancer or both.

The final results of sterility tests at Occidental by the National Institutes for Occupational Safety and Health, disclosed low sperm counts in many workers regularly and occasionally exposed to DBCP.

A normal sperm count among males is between 50-60 million. Physicians who tested 79 Occidental workers with oc-

Eileen Choffnes is a CBE Staff Scientist.

casional exposure to DBCP found 28 with sperm counts below 40 million. Of those 28, four men had no sperm at all after an averge employment time of 9.2 years; nine workers had sperm counts of 19 million or less; and 10 had counts of between 20-29 million. Nine of the 79 workers were DBCP applicators — of the nine, 5 had sperm counts below 45 million.

Both Dow Chemical and Shell Chemical were well aware of the adverse health effects but withheld this information from their workers.

Among 40 men tested who were regularly exposed to DBCP, 12 had sperm counts below 45 million. Of those 12, nine had no sperm at all, two had sperm counts of one million, and one had a sperm count of 10 million.

Shell Chemical study results to date show that 16 of 21 workers exposed to DBCP at either its Mobile, Alabama, or Denver, Colorado, plants had sperm counts below 40 million. Of those 16, two men had no sperm count at all, and 14 had counts between 20 and 35 million. Nine of the Shell workers tested so far worked at the Denver facility, which stopped DBCP production in April, 1975. Six of these workers had low sperm counts, and two of the six had no sperm production at all.

The Dow Chemical Company has begun to look for possible effects of DBCP on an unknown number of former employees at their Midland, Michigan, plant. DBCP was manufactured there from 1958-1976. Tests at Dow's Magnolia, Arkansas, facility in August, 1977, (which currently manufactures DBCP), demonstrated that approximately half of the 75 men tested were either sterile or had unusually low sperm counts.[2]

Since the discovery of worker sterility at the Occidental Chemical Company's plant, the state of California has halted the production and use of DBCP throughout the state. Shell Chemical Company has stopped selling DBCP and has urged its distributors to return their DBCP supplies as well as inform their customers and employees of a possible health hazard. Dow Chemical Company has also urged its approximately 250 domestic distributors of an unspecified number of foreign producers to return their stocks of DBCP to the company. Dow has also voluntarily halted its production of DBCP.

More than 2,000 industrial workers may have been exposed to DBCP. Beyond that, many thousands of agricultural workers have been exposed to DBCP through field applications. Additionally, Canadian researchers this year have found residual amounts of DBCP on vegetable products — 2 parts per million radishes and 1.5 ppm on carrots. (It should be noted that the level of DBCP vapor in the Dow plant which caused sterility was 1 ppm, and in the Shell plant 0.5 ppm.) The chemical has also been found in smaller amounts on crops such as broccoli, cauliflower, cucumbers, cabbage, and peanuts. Since DBCP is used on 20-25 crops, it is proper to assume that a large segment of the American public has been exposed to this substance at one time or another. How serious this exposure might be is an open question.

The Occupational Safety and Health Administration, on September 9, 1977, issued an emergency workplace standard of 10 parts per billion DBCP vapor over an eight hour day. Whether this level of DBCP exposure will protect the health of DBCP workers is unknown at this time.

Children wearing Tris-treated sleepwear may be subjected to the sterilizing effects of DBCP.

In a previous CBE Environmental Review (May, 1977) we ran a story on the toxic properties of a flame retardant added to children's sleepwear called Tris. Tris contains DBCP, so children wearing Tris-treated garments may not only risk getting cancer, but might also be subjected to the sterilizing effects of DBCP.

Recently the National Peach Council, a trade association which represents 6300 peach growers in 35 states, suggested to the Federal government that older workers who do not want children and persons who would like to get around religious bans against birth control be allowed to handle DBCP.[3] Robert K. Phillips, executive secretary of the peach council, said in a letter to OSHA that, "while involuntary sterility caused by a manufactured chemical may be bad, it is not necessarily so. After all, there are many people now paying to have themselves sterilized to assure that they will no longer become parents."[4] Does this mean that DBCP exposure may be a blessing in disguise?

We believe that this attitude on the part of industry is the epitome of the industry's callous disregard for the health and safety of their workers. While DBCP causes sterility in men exposed to it, it additionally has been shown to cause cancer in test animals. This aspect of DBCP exposure does not seem to phase industry in the least. Another example of 1984 newspeak.

A committee of the National Academy of Science has recently recommended that workers and job applicants be given detailed information about cancer hazards in their workplace. Had the workers been told in 1961 that DBCP damaged the sperm of test animals, they could have acted earlier to protect themselves.[5]

At the time of this writing, it is not known what the long-term effects of DBCP exposure are on humans. There is a very real possibility that the sterilizing effects of DBCP are irreversible. One can only accuse Shell and Dow Chemical Company of willfully withholding the known toxicity information of DBCP from their employees and applicators. This incident should give further impetus to the disclosure of testing information from a manufacturer to the public as required by the Toxic Substances Control Act. It will do nothing to help the men sterilized from DBCP exposure, however.

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1 *Environment Reporter*, Vol. 42, No. 175, p. 45538.

2 *The Wall Street Journal*, August 30,1977, p. 6.

3 New York Times, September 27, 1977, p.18.

4 Ibid.

5 New York Times, September 27,1977, p. 37.

Technical Note

Cleaning Up Power Plant Emissions

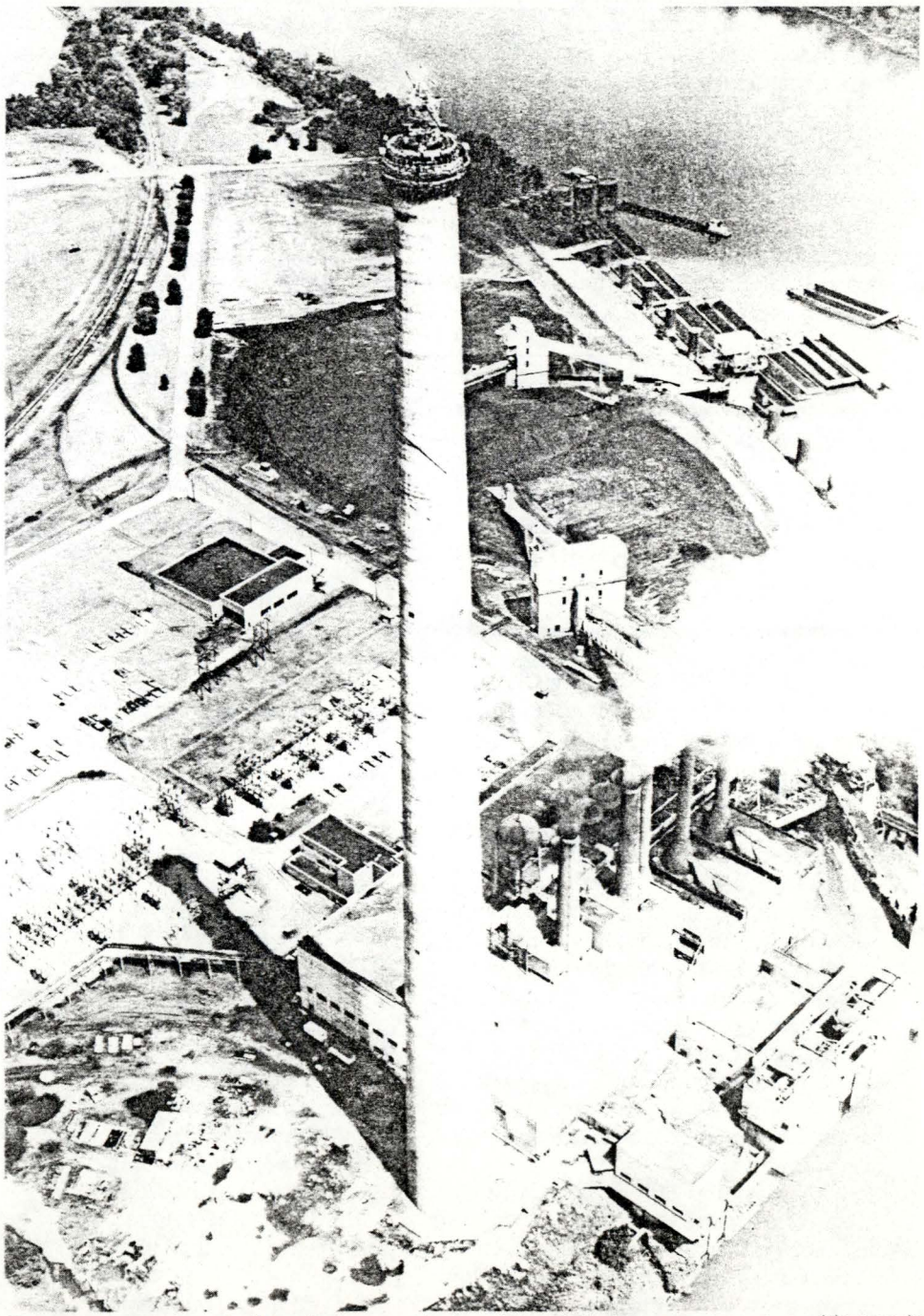
by Kevin Greene

The control of sulfur oxides from coal-fired power plants and large industrial boilers through the implementation of performance standards has proved one of the most troublesome programs under the Clean Air Act of 1970. Though the development of stack gas cleaning technology had reached an operational stage outside the U.S. on oil-fired industrial and utility boilers in Japan, Congress realized that a strong regulatory posture would be necessary to force the state-of-the-art of sulfur removal technology in this country in view of our large domestic coal reserves and the immediate health hazards then attributed to sulfur dioxide and particulate matter.

After promulgation of the national air quality standards, however, many states unfamiliar with new technological developments formulated their air pollution control plans around the use of naturally clean fuels. To the extent that cheap low sulfur fuels were readily available at the time of the Act's inception, the power industry and other large manufacturing sources found this compliance route relatively simple and financially attractive.[1] During the 1960's and early 1970's numerous utilities located in heavily polluted metropolitan areas and near the East coast converted their power plants from coal to oil in order to reduce sulfur and particulate emissions in stack gases.

Unfortunately, compliance with performance standards through the development of clean technology offered no immediate economic rewards. The successful demonstration of an innovative technology would likely cause an "across-the-board" tightening of standards throughout industry and require further pollution control expenditures for new sources. In the case of the electric utilities the installation of advanced systems like flue gas desulfurization (FGD) involved a substantial financial investment for equipment and personnel foreign to their normal mode of operation.

A major controversy involving the interpretation of a Clean Air Act provision that state air pollution control strategies impose "emission limitations" on stationary sources further retarded the development of clean technology. The larger utilities (primarily TVA) and some states in their implementation plans attempted to include intermittent control and tall stack-dispersion techniques as



Tall stacks have been built to disperse emissions from stationary sources over a wide area to reduce ground level concentrations in the vicinity of the source. (Photo courtesy of Pullman Kellogg)

Kevin Greene is a CBE Research Associate.

legitimate emission limitations to achieve compliance with air quality standards. Rather than limit the total amount of pollutants released into the atmosphere, tall stacks and intermittent controls used in conjunction seek to control sulfur dioxide concentrations in a particular locale by elevating emissions over a wider area and temporarily curtailing production during periods of poor air quality in order to reduce ground level concentrations. Dispersion enhancement measures have been the subject matter of a number of time-consuming legal disputes that ultimately required legislative clarification emphasizing constant reduction methods as the permanent solution to meeting air quality goals.

In light of the apparent failure in the regulatory mechanism to promote responsive utility participation in the development of new technology, the research burden shifted to the U.S. Environmental Protection Agency. In the last few years the Agency has co-sponsored several experimental FGD projects with varying degrees of success.

Sulfur dioxide scrubbers have improved to the point that a utility can select a system tailored to suit its needs.

Flue Gas Desulfurization

Early attempts at injecting limestone into utility boilers fired with powdered coal at Union Electric's Meremac Station and Kansas City Power and Light's Lawrence Station met with failure largely due to boiler tube erosion and scale deposit buiid-up. The numerous technical difficulties associated with boiler injection systems prompted the development of tail end sulfur dioxide removal systems located outside the combustion chamber. In a separate absorption tower, acidic sulfur compounds in the rising flue gas react chemically with alkaline removal agents dissolved in water to form a wet, throwaway sludge by-product.

Those smaller utilities that chose to install demonstration FGD systems on full scale units unfortunately became focal points of controversy within the power generating community, with varying opinions as to their system reliability, operating and capital costs, and waste disposal practices. In the early stages of FGD development the utilization of limestone as the scrubbing reactant lead to the formation of solid crystal deposits inside absorption towers which significantly limited sulfur dioxide removal efficiency. The precipitation of reagent and reaction products on equipment parts severely restricted the flow of gas through SO_2 removal systems. In many instances frequent shutdowns occurred while workmen entered the absorption chamber to remove hard sulfite and sulfate scale deposits.

While FGD manufacturers concentrated on equipment and operating modifications to improve scrubber performance, the utilities imposed rigorous maintenance and process control programs at existing FGD installations. At Kansas City Power and Light's 820-megawatt La Cygne Station, present maintenance procedures require that one scrubber module be cleaned each night on a rotational basis by a maintenance crew totally independent from the rest of the plant. Severe scaling problems have been checked by closely controlling system pH within a narrow range to avoid bringing excess reagent into the cleaning liquor.

After three years of extensive modifications, the availability of the system averaged 92% in 1976 while the scrubber exceeded its design efficiency of 80% sulfur removal and 99% particulate removal. In the future, Kansas City Power and Light officials expect the cost of producing power from their FGD-equipped No. 1 Unit, which burns locally available 5% sulfur coal, to be less expensive than the No. 2 Unit, which is scheduled to burn low sulfur Wyoming coal and be equipped with an electrostatic precipitator.[2]

Recent Technological Advances

Recent technological advances have greatly expanded upon the basic throwaway FGD design. Research-Cottrell offers a double loop FGD system containing two separate absorber sections with independent slurry recycling circuits. In the quencher stage, the flue gas is quenched and a portion of SO_2 is absorbed by the limestone slurry. The flue gas then passes to the main absorber stage where the remaining SO_2 is removed. This multi-stage process minimizes the formation of scale inside the absorption tower since two different sets of chemical conditions are controlled independently in each chamber. In addition, a lower pH environment in the quencher chamber enhances the formation of calcium sulfate — a solid waste end product with good handling and disposal characteristics.

The costs of scrubbers is more than reasonable given the hazardous nature of power plant emissions, some of which are converted to acid rain that threatens sensitive agricultural crops.

Modifications of system chemistry have similarly reduced scaling and maintenance problems associated with conventional throwaway systems. The double-alkali process involves the scrubbing of flue gas with a clear sodium alkali solution, regenerated with lime or limestone in a separate reaction tank. Outside the FGD apparatus, crystal formation can be better managed and limestone utilization is potentially higher than for basic wet scrubbing systems. Due to the presence of soluble sodium salts in the process liquor, special precautions must be taken to ensure that surface and groundwater contamination will not occur in the vicinity of the waste disposal site. Two double-alkali FGD processes, offered by Zurn Industries and FMC Corporation, employ vacuum filter systems that reduce sodium loss by removing as much of the soluble sodium compounds as possible before disposal. Both systems produce a concentrated, chalky cake which is easier to dispose of than wet sludge.

Another second-generation process that modifies the basic lime/limestone chemistry has been developed by M. W. Kellogg Company. A more reactive scrubbing liquid is obtained with the addition of a soluble sulfate (essentially magnesium sulfate) to the solution chemistry. In a manner similar to the double-alkali process, limestone is dissolved and reacted in an external hold tank where absorption conditions are optimal. Initial contact between flue gases and scrubbing solution takes place in a simple open horizontal spray chamber. The high gas velocity and low pressure drop of the system could con-

tribute to high SO_2 absorption rates and low energy consumption. Through the use of an oxidizer a more manageable gypsum by-product can be produced, thereby substantially reducing land requirements for solid waste disposal.

In the last few years, other variations of the basic wet scrubbing system have reached a commercial stage. Correspondingly, waste disposal practices have matured to a point where private companies and utilities have patented chemical fixation or stabilization processes that produce a structurally sound, environmentally acceptable landfill material from sludge and fly ash waste products. One industrial waste handling company, Dravo Corporation, has designed a waste disposal system for CAPCO/OHIO Edison's 1800-Megawatts Bruce Mansfield Units No. 1 and 2. A cement-like stabilizing agent will be added to the sludge to form a low-soluble stable material that can be returned to the earth as landfill.

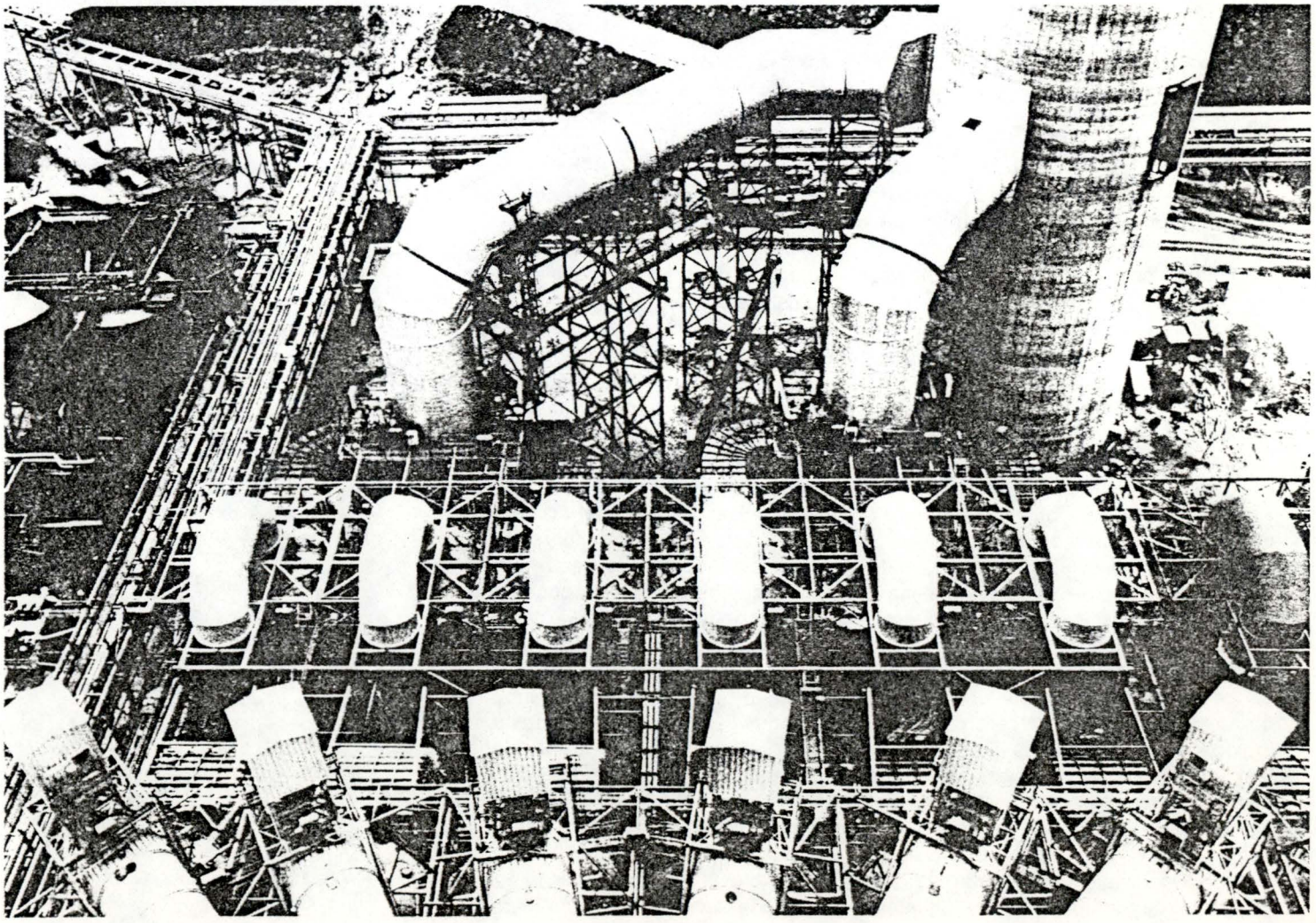
Though throwaway systems continue to offer utilities the most economical and practical means of meeting sulfur dioxide emission regulations, the high costs of solid waste management will likely promote the development and commercialization of regenerable scrubber systems that produce a marketable sulfur product. Assuming the end product will be sold, regenerative FGD systems will provide urban utilities with limited land resources a viable alternative to throwaway scrubbers.

As of now, U.S. EPA estimates that "53 electric power companies have installed or are building or planning 124 flue gas desulfurization systems. This is a 280% increase over the 44 systems planned, in construction or installed by 24 companies in the fall of 1973, when EPA held special hearings on sulfur dioxide control."[3] In the last four years, information on the chemistry and mechanics of sulfur dioxide scrubbing has sufficiently expanded to the stage that a prospective utility can select from a well-documented data base a system tailored to suit site-specific criteria.

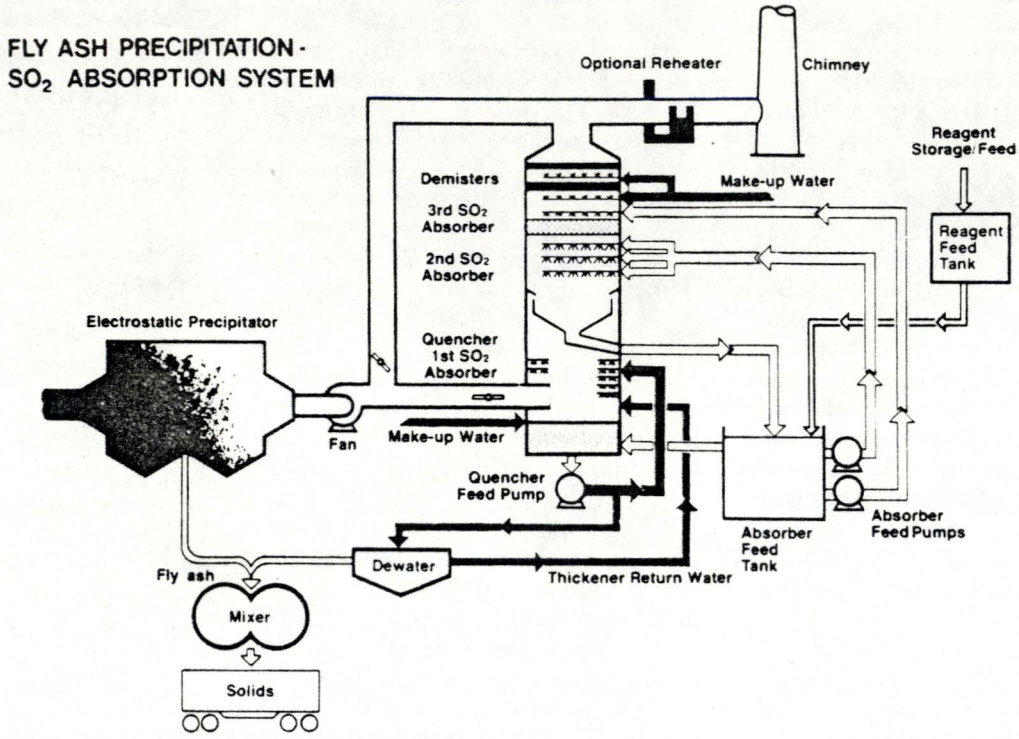
The EPA estimates that installing scrubbers on new coal-fired power plants would raise the average residential utility bill by only 2%.

Nonetheless, due to age and space limitations, flue gas desulfurization costs remain prohibitive for many existing facilities. Several years ago a Radian Corporation study illustrated a substantial cost differential between a difficult FGD retrofit on a small existing boiler versus a new installation. The study reported the initial installed costs for a Babcock and Wilcox FGD system on Commonwealth Edison's Will County

Flue Gas Desulfurization system consisting of six parallel scrubber trains at Pennsylvania Power Company's 835 Megawatt Bruce Mansfield Station Unit Number 1. (Photo by K. H. Workman, courtesy of Pennsylvania Power Company)



Schematic of a multi-stage limestone scrubber. (Reprinted courtesy of Research-Cottrell)



Unit No. 1 at $13.3 million or $75/kw. A scaled-up version of the same system installed on Kansas City Power and Light's La Cygne Station Unit No. 1 initially totaled $32.5 million or $40/kw.[4]

The anticipation of more stringent antipollution standards requiring deployment of the "best available" control technology on all new coal-fired power plants, regardless of coal quality, has prompted further FGD cost studies. The Electric Power Research Institute contends that tough pollution control requirements for new electric generating facilities will mean a 25% increase in the ratepayers electric bills by 1990. The U.S. EPA, on the other hand, reports that installing scrubbers on new coal-fired plants would raise the average residential utility bill by only 2%.[5]

In the long run the costs of installing a scrubber system on both new and large existing facilities will be more than reasonable given new scientific evidence on the hazardous nature of time-delayed and transport-related sulfur dioxide reaction products. Recent studies suggest that power plant emissions can, at some distance from the source, combine with moisture, aerosols, and particulates to form sulfates, including sulfuric acid which may return to the ground in the form of acid rain. In Illinois the acidity of rainfall has increased tenfold in the last twenty years, arousing concern over the impact acid rain might have on sensitive agricultural crops like soybeans.[6]

An equally significant consequence of FGD application by the electric power industry will be an increase in the usage of domestic coal while low sulfur fuels are preserved for critical air pollution areas. As coal becomes our primary source of fuel in the next few decades, air pollution programs must place emphasis on the maximum feasible reduction in emissions of air pollutants, while encouraging the development of more innovative control measures.

Flue gas desulfurization technology represents a tail end sulfur removal process that reduces gaseous emissions after they have been produced. Emphasis has begun to shift toward alternative technologies that limit the amount of pollutants created in the electric generating process. One promising technology, fluidized bed combustion, will offer utilities an efficient electrical generating process that cleanly burns high sulfur coal. In a fluidized bed system, crushed coal is injected into a boiler containing a bed of limestone. Hot air is blown through a grid plate which suspends and fluidizes the materials in the combustion area where noncombustible limestone particles capture most of the sulfur from the burning coal. In addition, relatively low combustion temperatures lessen the formation of nitrogen oxides.

In the future more basic technological changes will be fostered by the recognition that preventing the formation of hazardous wastes at the source can be less expensive in terms of energy and money from a long term standpoint. The efficiency of current productive systems will simultaneously be improved and conform with ecological requirements.

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[4] Radian Corporation, "Factors Affecting Ability to Retrofit Flue Gas Desulfurization Systems (EPA-450/3-74-015)", U.S. Environmental Protection Agency, Research Triangle Park, N.C., 1973, p. 17.

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[6] Chicago Tribune, June 13, 1977, Section 1.

Radioactivity in the Backyard

by Vicki Grayland

While Illinois Attorney General William Scott has been pushing for tighter controls on the huge nuclear waste site in Sheffield, Illinois, the people of West Chicago are fighting their own radioactive waste problem. They've found themselves up against two familiar foes: corporate irresponsibility and government bureaucracy.

Radioactive thorium, a rare earth element, had been processed at a plant in a residential area of West Chicago since the 1930's. The radioactive waste produced was disposed of in various ways: some was put into holding ponds, some was just heaped on the ground at the plant site, and some was disposed of at the town dump. The town dump has since become Reed-Keppler Park.

The Kerr-McGee Corporation of Oklahoma bought the plant in 1968. In 1973 it was discovered that radioactive materials and other pollutants were seeping from the holding ponds into the ground water. The Illinois Department of Public Health ordered strict controls to stop the contamination, but these proved expensive and Kerr-McGee decided to close the plant.

The company formulated decontamination plans and arranged to sell some of the land at the plant site to local citizens who would clean it up. Kerr-McGee planned to grade and fill the site, but the Nuclear Regulatory Commission (NRC) would not approve these plans. The sale was halted in 1976 as Kerr-McGee found itself totally responsible for the solution of the problem.

In July of this year, Kerr-McGee had 13,000 cubic feet of the high level radioactive waste moved from the site to the Sheffield waste dump. However, several mountainous heaps of thorium remain at the site where it can seep down through the soil and contaminate area groundwater. The state is still testing the groundwater on a regular basis, and it appears to be gradually cleansing itself.

Kerr-McGee has commissioned a contractor to study the area and ultimately dispose of the rest of the thorium. Once the contractor has formulated a disposal plan, it must be reviewed and approved by the NRC. This process could take up to two years.

In the meantime, there is a six foot fence, barbed wire, and warning signs to keep the public safe.

On the north side of town, in Reed-Keppler Park, there is also a fence around the contaminated area. There are plans to cover the site with two feet of earth; and this, according to the state Department of Public Health, should bring the area to a safe normal background level of radiation.

State public health officials and scientists from nearby Argonne National Laboratory see no health problems from the radiation to date, and don't expect any.

Just stay outside the fence.

Vicki Grayland is Editor of CBE Environmental Review.

Kerr-McGee's plant in West Chicago has been fenced off and warning signs have been posted, but several heaps of radioactive thorium waste remain.

Books About Birds

Reviewed by Charlotte d'Anjou

Canada Geese, *words by Jack Denton Scott, G. P. Putnam's Sons, 64 pages, photographs by Ozzie Sweet, $6.95. For everyone.*

"The sounds of migrating Canada geese are as stirring as the sight of them...They have been described in various ways: a cry of wildness, an exultant scream of freedom; one of the last pure sounds left in a world overwhelmed by civilization. There is nostalgia in it. And poetry. The Cree Indians of the Hudson Bay region call these Canada geese barking across the sky the "hounds of heaven." Mr. Scott, famous naturalist, and Mr. Sweet, renowned photographer, have produced a work almost as stirring as the geese themselves. There are more than fifty pictures of geese, many taken at Wisconsin's Horicon Marsh during the fall migration. Some 3,000,000 Canada Geese take part in the migration each year, flying in strict V formation. This sight has inspired human beings for centuries, and this book will be an inspiration and pleasure to all who experience it. The qualities of peacefulness, fierce loyalty to their lifelong mates, and incredible efficiency make the Canada goose a creature worthy of this masterful portrait.

Charlotte d'Anjou is Children's Editor of CBE Environmental Review.

Illustration by Rondi Anderson

Birds of Our Land, *Teaching Pictures, writer, Mildred Hurd, David C. Cook Publishing Co., artist Carl Hauge, $5.50. Grades K-3.*

This is a portfolio containing a 39-page resource manual and 16 full-color, poster-size pictures of American birds. The manual is packed with stories, poems, facts, and suggested activities to help primary students learn what birds are all about, both in nature and in literature. Two Japanese poetry forms are introduced, Haiku and Tanka, and there are dozens of English and American poems and nursery rhymes, including the following fragment from Lord Tennyson:

Listen to the Crows, *by Laurence Pringle, Thomas Y. Crowell Co., 33 pages, illustrated by Ted Lewin, $5.95. Ages 10 and up.*

One of our most respected author-conservationists solves some of the riddles about one of our most familiar, most mysterious birds. Crows, it seems, not only have a language for announcing, warning, calling and cussing, but can count, and even have names! Mr. Pringle describes the language, its uses, and how it is being investigated, in a well-researched text. The black and white pictures by Mr. Lewin manage to be both beautiful and humorous, as are crows. One of the most important passages in the book comes near the end, "Now our ideas about crows and all nature are changing. To think that any living thing is either all good or all bad is silly. Crows are just crows. They are part of nature, and everything in nature, one way or another, is valuable."

The Eagle

He clasps the crag with crooked hands;
Close to the sun in lonely lands,
Ringed with the azure world, he stands.
The wrinkled sea beneath him crawls;
He watches from his mountain walls,
And like a thunderbolt he falls.

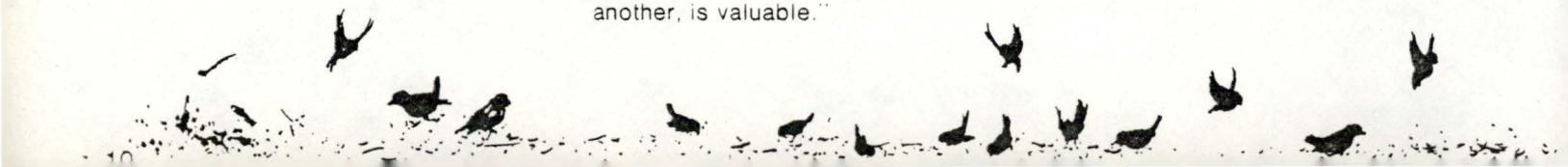
There is scientific emphasis also, and the manual and the lovely bird posters make a valuable teaching kit, perfect for school or scouts.

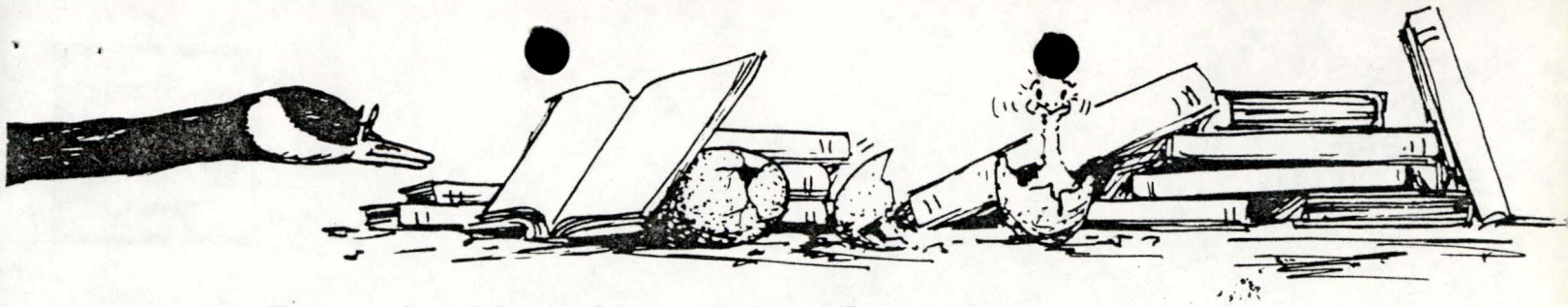
Look for a Bird, *by Edith Thacher Hurd. Harper & Row, A Science I CAN READ Book. 31 pages, illustrated by Clement Hurd, $4.95. Ages 4-8.*

This is a bird book for little kids, with full-color pictures that show the birds just as they are so the reader will know them if he sees them. Each picture shows a male, a female and some infant birds, some eggs, and a nest. The author tells some facts about each bird, and what to look for if you go bird watching. Here is an example:

The Ruby-Throated Hummingbird

"The mother Hummingbird gathers spiderwebs. She puts them around her nest with her long bill. The spiderwebs make the nest strong. They hold the nest in the tree. A Hummingbird's egg is as small as a pea. A Hummingbird baby is as small as a honeybee. Look for: A tiny bird. Male has red throat. Wings move so fast they hum." This is a very pretty book.



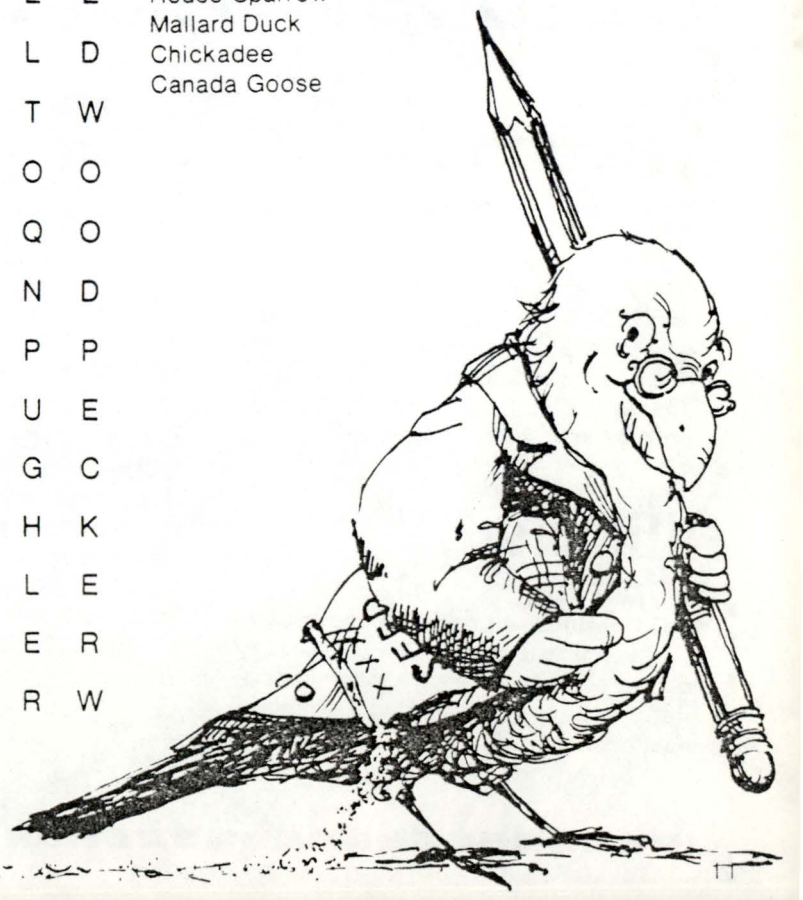


Nature Puzzle Number 6 by Charley

W O N B A L D E A G L E T H Y
O U G V E M A L L Y L O U O R
S I G S L I M S F S U S T U O
D P S H C A N A D A G O O S E
R U T T P E N R F I G M L E L
I C A R D I N A L M N I R S L
B L W I B E G T E R I W E P R
G A I O D L E E A N R G K A E
N E R F O L U A O S R H C R D
I P E N E D T E E N E E E R H
M T H D S E T S J E H A P O E
M V E I A W N H S A B L D W A
U O O S D K A X R Y Y C O A D
H C O D C D C L P U A L O E E
D S T P S R I I L N S E W L D
E I K U B I E R H O A H Y T W
T I C R O B N E X C W M N O O
A U U P R G E A C O B A W Q O
O P D L W N I K R H W T O N D
R U D E I I C C T S O D D P P
H A R M L K A E E S N W T U E
T X A A M C T T O L K J L G C
Y S L R E O U N S E O F T H K
B A L T I M O R E O R I O L E
U B A I S E B A L I S O V E R
R F M N R E N N U R D A O R W

Hidden in this confusion of letters are the names of 22 of the birds featured in the books on the opposite page. The names may be written frontward, backward, corner-to-corner, upward, downward, or across. How many can you find?

Bald Eagle
Pigeon
Blue Jay
Purple Martin
Barn Swallow
Mockingbird
Baltimore Oriole
Wood Thrush
Redheaded Woodpecker
Road Runner
Ruby-throated Hummingbird
Mute Swan
Herring Gull
Robin
Cardinal
Crow
Downy Woodpecker
Screech Owl
House Sparrow
Mallard Duck
Chickadee
Canada Goose



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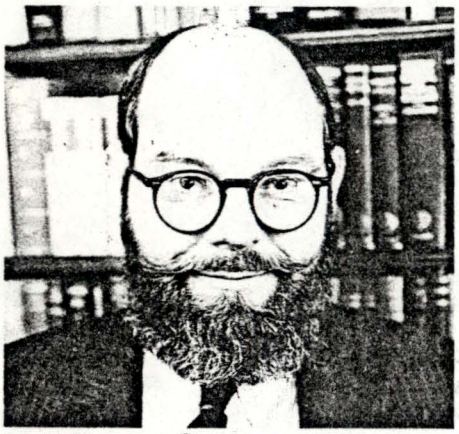
David Dinsmore Comey

Televised Nuclear Debate

CBE's Executive Director David Comey and Henry W. Kendall, physics professor at MIT, will debate Congressman John Anderson (R-Ill.) and Richard Wilson, professor of physics at Harvard, on whether there should be a moratorium on nuclear power plant construction. The debate will be broadcast on public television on the show "The Advocates: A Special Debate on Nuclear Power."

Chicago: Channel 11, Friday October 14, 9 p.m.
Milwaukee: Channel 10, Thursday October 13, 8 p.m. Rebroadcast Saturday October 14, 7 p.m.
Madison: Channel 21, Saturday October 15, 5:30 p.m.

October Calendar

Wisconsin

3-7, 17-21

PSC Advance Plan Hearings
CBE's Executive Director David Comey will testify at the Wisconsin Public Service Commisson Advance Plan Hearings. At the Hill Farm State Office Building, Madison, 9 a.m.

Illinois

20,21

ICC Hearings — Load Forecasting
Cross examination of ICC witnesses on load forecasting for the six major Illinois electric utilities, including Commonwealth Edison. CBE will participate. 160 N. LaSalle Street, Chicago, 10 a.m.

20

Governors' Great Lakes Interdisciplinary Council
CBE Staff Scientist Eileen Choffnes will testify on pesticide use in the six Great Lakes states at this meeting. From 9 a.m. to 3:30 p.m. at the Windsor Inn, 6565 N. Mannheim Road, Rosemont.

24

ICC Hearings — Peak Load Pricing
Cross examination of utility witnesses on peak load pricing for the six major Illinois electric utilities, including Commonwealth Edison. CBE will participate. Tentatively scheduled for 10 a.m. at 160 N. LaSalle, Chicago. Call CBE for confirmation.

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CHICAGO: Suite 2610,
59 E. Van Buren,
Chicago, Illinois 60605
312—939-1530
DE KALB: 323 East Lincoln Highway
DeKalb, Illinois 60115
815—758-1684
MILWAUKEE: Suite 502,
536 W. Wisconsin,
Milwaukee, Wisconsin 53203
414—271-7475
MADISON: 512 W. Wilson
Madison, Wisconsin 53703
608—251-2804

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Editor: Victoria Grayland
Children's Editor: Charlotte d'Anjou
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Cover Photo: Rather than reduce the total amount of pollutants emitted into the atmosphere, some utilities have devised rather dubious dispersion techniques to meet air quality standards. One of these methods involves the use of tall stacks that dilute pollutant concentrations by spreading emissions over a wide area. (Photo courtesy of Pullman Kellogg)

Environmental Review

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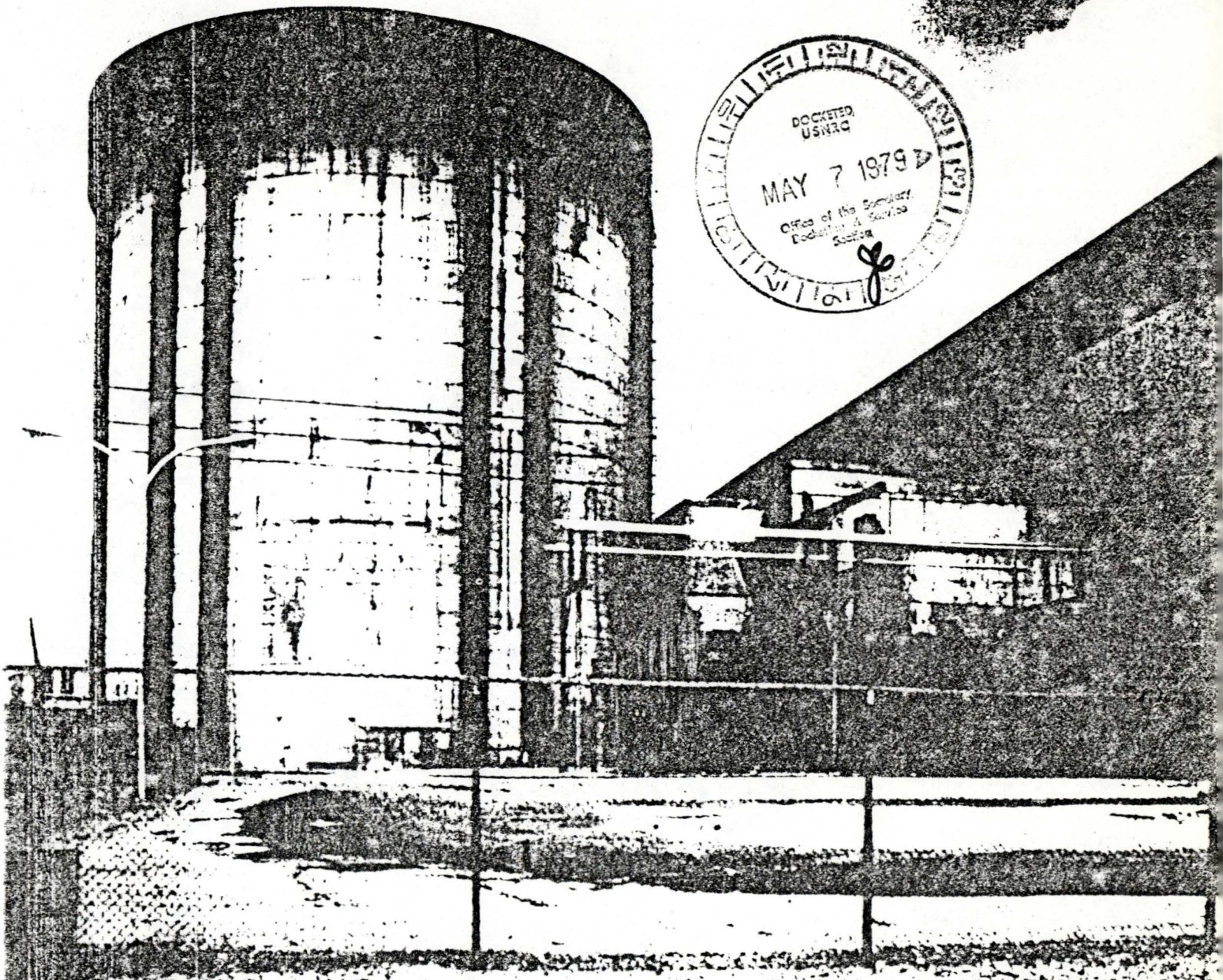
OCTOBER 1978



Warning: Nuclear Power is Hazardous to Civil Liberties

CBE Briefs

National

Energy Policy

NRC Safety Request

CBE discovered that, at the Hatch Nuclear Plant near Baxley, Georgia, the entire emergency core cooling system could be locked out of commission without this fact being annunciated in the control room. CBE asked the NRC to issue an Enforcement Bulletin to all nuclear plants in the country to verify that they do not suffer the same design deficiency.

Toxic Substances

Aquatic Toxicology

CBE staff scientists were invited to give a paper at a meeting held in Waterville Valley, N.H. for four days. This meeting, attended by aquatic toxicologists from the U.S., Europe, and Canada, addressed the hazards presented by chemical substances to aquatic life. CBE focused on the philosophy behind our approach to toxic substances regulation and on the data base needed to develop a water quality criterion (that level of a pollutant in water below which human health and the environment will be protected).

Water Pollution

Water Pollution Control Act

CBE is preparing comments to submit to the U.S. Environmental Protection Agency (EPA) on the addition of phosphorus to the list of conventional pollutants subject to permit limitations under the Federal Water Pollution Control Act. Phosphorus from municipal treatment facilities is recognized as the most important element limiting the growth and reproduction of photoplankton (algae) in freshwater lakes.

Wisconsin

Energy Policy

Pleasant Prairie Power Plant

CBE filed a brief before the Wisconsin Public Service Commission (PSC) requesting that the second 580 Megawatt coal-fired electric generating unit at Pleasant Prairie be equipped with sulfur dioxide scrubbers. At a PSC Commissioner's hearing on September 3, the PSC agreed with the substantive issues raised by CBE and postponed further construction approval on Unit II until an adequate sulfur dioxide control strategy can be recommended by the Wisconsin Department of Natural Resources (DNR).

WEPCo Rate Hike

Wisconsin Electric Power Company (WEPCo) for the first time in its history was denied a 3.4%, $17 million interim rate increase. CBE participated as the principal intervenor in the case and demonstrated at the hearings that WEPCo is in excellent financial condition and not in need of rate relief.

Wisconsin Advance Plan

The PSC in a final order, after a year and a half of hearings, concluded that no new applications for nuclear power plants, other than Tyrone I and Haben I, will be accepted until the uncertainties of waste disposal, uranium availability, and decommissioning costs are resolved. The PSC accurately determined that nuclear-generated electricity will be more expensive than coal-generated electricity. CBE, a principal party in the case, had presented major testimony on the unreliability and poor economics of nuclear power.

Air Pollution

Non-Attainment Areas

CBE was successful in its petition to U.S. EPA to redesignate areas in Milwaukee as non-attainment areas for particulates. CBE contended that the Wisconsin DNR ignored its own criteria in setting the non-attainment boundary and excluded obvious point sources. EPA agreed with CBE and twice sent the DNR's submittal back for redesignations. CBE's efforts have resulted in almost doubling the size of the non-attainment area in Milwaukee. This will help to protect local air resources.

Citizen Action

Legislative Voting Records

Wisconsin's Environmental Decade has issued a 1977-78 environmental voting record for Wisconsin state legislators. For copies contact CBE's Madison office.

California

Air Pollution

Bay Area Power Plants

The Hearing Board of the Bay Area Pollution Control District has denied a variance request by the Pacific Gas & Electric Company, (PG&E) which would have provided the company with immunity from prosecution for air pollution violations at two of its power plants. CBE intervened before the Hearing Board and provided the only testimony opposing the variance. CBE's involvement also set a precedent for public involvement in pollution issues, as our testimony was accepted by the Hearing Board over the angry objections of the PG&E attorney who sought to have it stricken from the record.

Sulfur Dioxide Petition

CBE has petitioned the California Air Resources Board (CARB) to strengthen the sulfur dioxide standard for the Bay Area. The local Air Pollution Control District has been under heavy pressure from government agencies to tighten the existing, extremely lax standard, but it has refused to do so. CBE is asking the CARB to hold hearings to consider a stricter standard and to enact this standard if the Control District does not shortly do so.

Urich Oil

The Bay Area Pollution Control District has issued tentatively approval for the construction of a 10,000-barrel-per-day refinery in Martinez. CBE submitted comments revealing that the proposed refinery should be considered a major source of air pollution and be required to provide emission reductions from other air pollution sources to offset the increases from its own facility.

Nearer my God to Thee

There is something funny about nuclear power.

Every morning, the mailman drops about a dozen large manila envelopes on the front desk of CBE's office in Chicago. These envelopes contain reports about problems at the nearly 70 nuclear power plants in operation around the country. CBE receives them as a result of consent decrees or settlement agreements arising from lawsuits brought in years past, and we use them as a basis for writing reports about the safety and security problems of the nuclear industry.

Many of the reports make very dry reading, even to the experts on CBE's staff who are familiar with the technical jargon of the nuclear industry. But occasionally peals of laughter are heard through the office as someone comes across a particularly outrageous incident that has happened at some nuclear plant, usually as a result of human stupidity or incompetence.

Taken in the serious context that some of these incidents involve safety violations — and such a violation could precipitate a major nuclear accident that could kill thousands of people and cause billions of dollars of property damage — none of them really should be considered funny.

But in order to keep from staying awake at night worrying (or worse, having nightmares all the time), we have developed a sense of humor about these events — much like the surgeons in one of our favorite television programs, M*A*S*H.

In that spirit, the *CBE Environmental Review* proposes to bring its readers, on an occasional and irregular basis, glimpses of the wonderful, wacky world of nuclear power plant operation. This issue's nuggets involve nuclear power plant security and emergency planning for evacuating surrounding populations in the event of a serious nuclear power plant accident.

One such story involves a gentleman known in the Nuclear Regulatory Commission (NRC) report as "Individual F."

It seems that in late January, 1976, Individual F," a worker at the Three Mile Island Nuclear Plant of Metropolitan Edison Co., in Middletown, Pennsylvania, was despondent. He was so despondent that he decided to kill himself. And he chose to accomplish this feat on his employer's property.

"Individual F" drove into the nuclear plant past several guards, parked his car, and then climbed over an eight-foot tall, barbed-wire security fence. He was observed climbing over the fence by an engineer, who later told NRC investigators that his only thought was that the individual was "lazy" not to enter the plant by the gate, in the normal fashion.

The first warning plant guards had that something might be amiss came when they heard someone singing religious songs! Since it was dark, and the weather was bad, they had difficulty pinpointing the source, however.

He sang while the guards searched for him on the ground below.

As it turned out, "Individual F" had climbed to the top of the nuclear power plant's borated water tank. There, presumably to inspire himself for the task ahead, he sang several choruses of "Nearer My God to Thee" while guards searched fruitlessly for him on the ground below.

Evidently his own singing so inspired "Individual F" that he decided to go on living. He climbed down from the borated water tank, walked back to the fence, climbed over it, and got in his car and drove past guards, out of the plant. Needless to say, the guards never apprehended him.

Stories of laxity on the part of nuclear power plant guards unfortunately are common in NRC records. Many of the difficulties seem to arise from the fact that nuclear power plant security guards do a very boring job, for which they are not well paid.

In one instance, for example, a security guard at Commonwealth Edison's Zion Station near Chicago had been stationed inside the plant to keep watch over vital safety equipment. This was because of past incidents in which someone on the plant staff had purposely disabled the safety equipment as a way of venting his gripes against his employer.

This security guard's job was to sit on a chair and make sure that no unauthorized person tampered with the equipment. Evidently he must have begun to wonder what could be so important about this equipment he had been assigned to protect, because one day he tried turning a large valve located just behind his chair.

Less than a minute later, several reactor operators from the control room came running down. The valve he had closed controlled the flow of cooling water to the reactor, which was then operating at full power.

Since it required six full revolutions of the valve wheel to shut off the feedwater, the NRC inspectors later refused to accept the guard's explanation that he had just "leaned" on the valve. The NRC concluded that the guard acted not out of maliciousness but out of boredom. The inspectors also concluded, however, that the plant's management had never bothered to impress upon this guard the possible dire consequences that could arise from using the plant's safety equipment as a source of entertainment.

Other NRC investigations have discovered other apparent pranks, presumably committed by bored or disaffected plant workers. In one instance the NRC discovered that, at the Millstone Station in New London, Connecticut, someone switched the positions of the plastic buttons used to designate alarm locations. If an alarm had gone off, plant per-

This account was compiled by Flora Johnson, editor of the *CBE Environmental Review*, in consultation with Peter Cleary, Staff Physicist, and David Comey, CBE President. Copies of *Nuclear Power Plant Evacuation Plans* (31 pp.) are available from our Chicago office for $3.00 which covers printing and postage.

sonnel would have been sent rushing to the wrong part of the plant.

On February 5, 1978, one guard at the Palisades Nuclear Power Plant in Covert, Michigan, decided to wile away the hours by going to sleep. He fell into such a deep sleep that someone crept up on him and stole his .38 calibre revolver and six rounds of ammunition. The NRC learned of this incident only because they received an anonymous tip. To our knowledge, the culprit has not been apprehended.

Personnel would have been sent rushing to the wrong part of the plant.

Other guards at the Millstone Station have seen fit to amuse themselves by hunting rabbits on the utility's property, even though the guards were supposed to be on duty. The NRC report of this incident notes dryly: "The rabbit shooting did not occur in the designated wildlife area."

A less amusing feature of nuclear power plant security involves falsification of guard records, which the NRC has found at several stations. At the La Crosse Boiling Water Reactor in Wisconsin, where there have been criminal indictments, the NRC found that the qualifications of three guards had been backdated by the Guard Service Contractor so as to give the impression that they had received far more training than was in fact the case. Questioning of the contractor revealed that he seemed to be under the impression that a nuclear power plant is no different an operation from an ordinary factory.

The General Accounting Office (GAO) has also investigated security at nuclear power plants. At one plant not specified in the GAO report, their auditors found that they could pick locks and open doors to vital areas by using a screwdriver or a piece of wire they found on the ground near the door.

Finally, a GAO inspector opened a door which rang an alarm in the guard house. He waited several minutes but no one came. When the guard house was called, to find out why no one had responded to the alarm, a guard replied that all the available guards were too busy.

In a study recently conducted by CBE, we investigated to see what precautions have been taken to protect citizens in the event of a nuclear power plant accident. We found that no federal agency was willing to accept responsibility for such a contingency — even though a major accident at a nuclear power plant would require that everyone within 40 miles downwind of the plant be evacuated, preferably within hours. (In response to our report, President Carter took steps to remedy this deficiency.)

We also found that only four states have NRC-approved evacuation plans. Even in these states, CBE found that tests of the evacuation plans seldom yielded reassuring results. Indeed, the events resulting from these tests reminded us more of movies starring the Keystone Cops than of what we would hope to see happen in the event of a nuclear catastrophe.

For example, in New Jersey a practice drill was carried out on August 2, 1977, at the state's Salem I plant. Emergency systems ran smoothly within the plant, but not so well beyond its walls.

According to plan, the plant was supposed to be able to communicate its difficulties to the State Police, the governor, and the surrounding townships within nine minutes. The drill began at 2 p.m., but the nearby Lower Alloways Creek township did not hear of the "danger" until 3:40 p.m. Among the problems: Emergency telephones installed in the Lower Alloways Creek municipal buildings did not work.

Another township in the area was never informed of the "danger" or of the "radioactive cloud" that passed above it. It seems this township was feuding with Lower Alloways Creek over which township should be allowed to derive taxation revenue from the Salem I plant.

Yet another township refused to participate unless someone bought special uniforms for their emergency officials.

In another instance, Commonwealth Edison, in theory, had prepared evacuation plans for its Zion, Dresden, and Quad-Cities plants. A 1975 NRC inspection turned up numerous deficiencies in these plans — not the least of which was the fact that the lists of emergency telephone numbers at the plants had not been updated in years, and many of these numbers were, as a result, incorrect.

In 1975, the state of Minnesota carried out a mock emergency warning of residents living within three miles of their Monticello plant, only to discover that most of their communications systems required use of the telephone, and telephone switchboards were jammed during most of the exercise.

A three-hour mock drill by the state of Oregon in the summer of 1974, at the Trojan Plant, also ran into communications problems. Radiation monitoring personnel had to submit their findings from pay telephones because they had no radio-telephones in their cars.

At one point during this drill, a volunteer received instructions from the plant staff: They said, "Go West." Eventually, after driving 52 miles and running into the Pacific Ocean, he called the plant back to ask, "Is this far enough?"

On January 12, 1978, a "General Emergency" drill was held at the Fort St. Vrain Nuclear Power Plant in Colorado. Plant personnel did call emergency service agencies in the state to tell them that there had been an "incident" at the plant. But they neglected to tell the state what kind of "incident" had occurred, how much "radioactivity" had been released, or in what direction the wind was blowing.

Emergency telephones did not work.

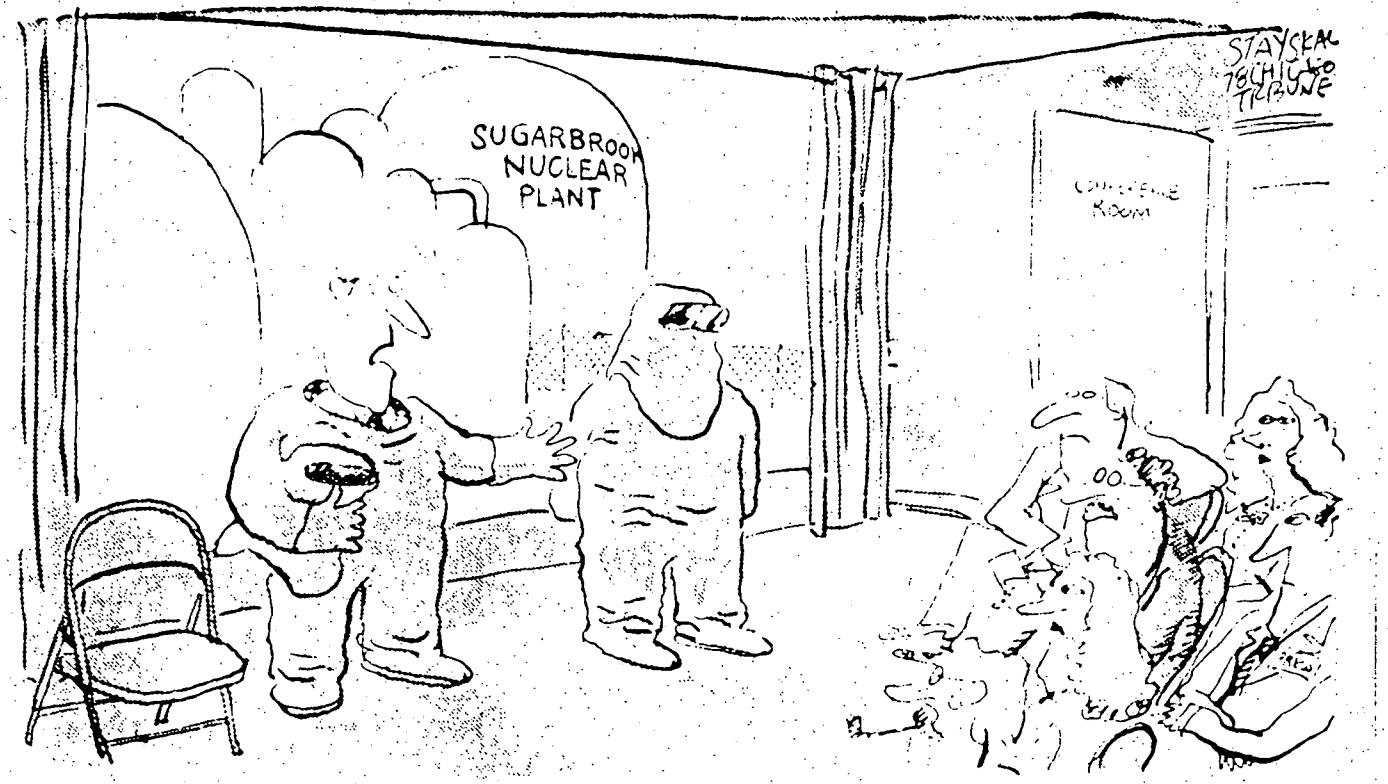
Of course, one of the reasons for holding drills is to pinpoint potential problems. So it might have been expected that, *eleven days later*, when there was a real, unplanned release of radioactive helium gas from the Fort St. Vrain Plant, problems that had arisen during the drill might have been corrected.

Not so. Once again plant personnel called emergency authorities. Once again, they forgot to mention how much radiation was involved or where it might be headed.

Even more difficulties arose: The plant was evacuated at 9:50 a.m., but statewide emergency services were not notified until 10:14 a.m.

At 10:30 a.m., the local sheriff's office called the plant and finally found out

Cartoon reprinted courtesy of *The Chicago Tribune*.



"It's true that some cracks have developed in the safety system's steel housing. But there is no threat of danger, as Dr. Morgan will explain."

more about the accident. But the utility told the sheriff's office the *wrong* wind direction! As a result, had there been a major release of radioactivity, large numbers of people would have been evacuated *from* a safe sector *into* a contaminated one.

Civil Defense learned of the fire in the local coffee shop.

State police were supposed to surround the plant with roadblocks. This was not only to keep people out but also to direct people leaving the area to locations where they could be monitored and, if necessary, decontaminated. By the time roadblocks were set up, however, the evacuation of the plant had already taken place. No one knew where the people who had been evacuated had gone.

Another non-mock incident occurred in March, 1975, when there was a fire at the Brown's Ferry Nuclear Power Plant near Decatur, Alabama. The fire started when two workmen used a candle to search for an air leak in the plant's insulation. This insulation, as it turned out, was highly flammable.

By the time the fire was extinguished, it had burned through dozens of control cables. Brown's Ferry came frighteningly close to a major accident.

As it happens, the local Civil Defense Officer did have a plan to evacuate everyone within seven miles of the plant. But there was a flaw in this plan. The fire occurred on a Saturday. The Civil Defense Officer learned of the fire on Monday morning, when he heard about it in the local coffee shop.

The County Sheriff also heard about the fire after it was over. It later turned out that he did not even have a copy of the emergency plan.

The Sheriff of a neighboring county heard about the fire about four hours after it started. He said, "I was asked to keep quiet about the incident to avoid any panic."

An NRC investigation discovered that the plant staff had operated a "try once and fail" method of trying to reach emergency services. *One* call was made to the County Sheriff, who didn't answer his telephone. Similarly, one attempt was made to reach each of the principal support agencies in the surrounding area. If the attempt was unsuccessful, no further attempt was made. Several agency officials said later that they had no copy of the emergency plan and did not know what their responsibilities would have been if they *had* been contacted.

A volunteer was directed to "Go west."

The stories we have told here, unfortunately, are only a few of those we have found while combing through official records. We hope to share others with our readers in the future.

Present security precautions at nuclear power plants are inadequate. This sign at the Donald C. Cook plant in Bridgman, Michigan will not discourage would be saboteurs. (Photo by David Dinsmore Comey.)

Nuclear Power and Civil Liberties

The consequences of nuclear reactor sabotage are so great that extraordinary measures are required to protect nuclear facilities. These measures infringe upon the civil liberties of a large segment of the population.

by David Dinsmore Comey

Is there a fundamental conflict between exploitation of nuclear power and civil liberties? Many people have thought so and much was written on this subject several years ago. As one who raised the question early on, I contributed to the ink spilled in this controversy.

After an interlude of several years the issues have now resurfaced in somewhat different form. Recently John Shattuck, director of the Washington office of the American Civil Liberties Union (ACLU), gave eloquent testimony against proposed Nuclear Regulatory Commission (NRC) rules designed to protect nuclear power facilities against sabotage. The purpose of this article is to restate the positions I and others have taken, in light of Mr. Shattuck's remarks.

The threat to civil liberties from nuclear power arises because of the unusual security measures required to protect nuclear power facilities. These security procedures have an immediate impact on nuclear industry employees.

I should rather read the Bill of Rights by candlelight than not have it to read at all.

[illegible] intrusive security [illegible] degrees of bodily [illegible] impositions on their privacy [illegible]. Some people argue that [illegible] are the price that must be paid [illegible] a nuclear facility, and that these intrusions do not infringe [illegible] rights of citizens outside the industry. I argue, however that the existence of institutional mechanisms maintaining security within a widespread industry, employing thousands of people, has a "chilling effect" on civil liberties in the population at large.

The greatest potential threat to civil liberties lies in the possibility that security forces will perceive civilians outside the nuclear industry as dangerous.

David Dinsmore Comey is President of CBE. He was a member of the Nuclear Proliferation and Safeguards Advisory Panel of the Office of Technology Assessment of the U.S. Congress and has been retained by the California Energy Commission in several proceedings as an expert witness on reactor sabotage and the civil liberties implications of the nuclear fuel cycle. In 1974, he received the First Environmental Quality Award of the U.S. Environmental Protection Agency "for services that have immeasurably improved the design and safety review of nuclear reactors."

People who might be perceived in this way include non-violent protestors and those who foment work stoppages, as well as potential saboteurs and terrorists, because specialists in security procedures tend to disregard the distinctions among different forms of protest.

Once institutional mechanisms to protect nuclear facilities against external threats are created, those operating them may be tempted to abuse them or, in "emergencies," to expand their scope beyond what was originaly intended. Parkinson's Law applies to the security and intelligence community: Any apparatus designed to spy on one part of the population will tend to expand until it is spying on the whole population. The logic behind this tendency is compelling, for perfect security is possible only with "perfect knowledge" of potential threats, no matter how remote or improbable they may be.

The civil liberties threatened by nuclear power are among those guaranteed by the Bill of Rights in the United States Constitution. They include the First Amendment rights to free speech and freedom of association. They also include the guarantees of the Fourth through Eighth and Fourteenth Amendments against unreasonable search and seizure, self-incrimination, and coercive prosecutorial activities and the right to be represented by legal counsel and to confront one's accusers in adjudicatory procedings.

Nuclear reactors rank high on a list of potential terrorist targets.

I am committed to the protection of these freedoms. As I wrote several years ago, "A spokesman for Commonwealth Edison recently stated that safeguards against nuclear terrorism can be accomplished with no more social displacement than the guarding of gold. A more apt comparison would be to the social displacement involved in guarding American citizens of Japanese ancestry during World War II. The nuclear industry's favorite taunt to its critics is 'Well, do you want to go back to candles?' That is hardly the choice we face, of course, but if it were, then I should rather read the Bill of Rights by candlelight than not have it to read at all."[1]

During the last two years, however, I have conducted research into the likelihood and the feasibility of reactor sabotage. Although my report on this subject has not yet been cleared for publication, my conclusions are:

The possible consequences of a sabotage-initiated reactor accident are so severe as to make reactor sabotage a societal risk as great as or greater than that posed by a nuclear weapon.

Given that terrorists prefer targets offering low risk and high visibility, nuclear reactors rank high on a list of potential terrorist targets.

The NRC has greatly overestimated the difficulty of planning and carrying out a successful act of reactor sabotage, and the security measures taken by the NRC to date are insufficient to prevent such sabotage from taking place.

For these reasons, I have been a strong advocate of upgrading the security and safeguard systems at civilian nuclear power plants.

In order to pursue this question further, we must distinguish between a plutonium-fueled nuclear program involving breeder reactors and spent-fuel reprocessing, on one hand, and the existing light-water reactors with no fuel reprocessing, on the other.

In the breeder economy, large amounts of plutonium are available for diversion or hijacking at several points in the fuel cycle, especially during transport to the fuel fabrication facility. Small private groups, having obtained this plutonium, can turn it into functional nuclear weapons. The material is so toxic that it can be used to make a radiological weapon even by someone who does not know how to make a nuclear bomb. Either device would be small enough to be capable of being concealed and transported without detection. Either device would give a group of dissidents the destructive potential of a nation-state.

An ordinary economy can tolerate a certain number of "dangerous" people. In a country in which civil liberties are protected, we accept some danger rather than create a police state to eliminate all risk. In a plutonium economy, however, the potential danger even from a small group of dissidents is so great that it argues for the elimination not only of people proven to be dangerous but also of those who are only suspected of being dangerous. As the potential for violence increases, society's tolerance of those who differ must decrease.

Russell Ayres has said that a plutonium economy "provides the first rational justification for widespread intelligence gathering against the civilian population. In the past, federal courts have taken a skeptical view of attempts to justify spying on national security grounds, but with the very real threat of nuclear terrorism in the picture, that justification is going to sound very convincing."[3] Elsewhere, he said, "To the extent that we have civil liberties at all today, it is because we have not had to ask questions like whether it is better to torture a suspected terrorist than to let a city go up in flames."[4]

More than 21,600 people would be subject to investigative clearance by 1985.

Fortunately, we do not have a plutonium-based economy, and the prospect that we will ever have one dims rapidly as solar and other renewable sources of energy become economically competitive with breeder reactors. We do have light-water reactors, however, and our present nuclear program contemplates approximately 200 such reactors by the year 2000. How does the civil liberties threat posed by these reactors differ from that presented by a plutonium economy?

As long as the spent fuel from light-water reactors is not reprocessed to obtain plutonium, there is no danger that bomb-grade nuclear material might fall into the wrong hands. No such special nuclear material is available in a "throw-away" nuclear fuel cycle. But sabotage of nuclear power reactors, waste storage facilities, and the casks used to transport spent fuel remains a possibility. Of these three, reactor sabotage poses the greatest threat.

I believe that nuclear power plants and waste storage facilities can be guarded against assault from outside groups so that the probability of success would be too low to make such an assault likely. Guarding nuclear facilities to this extent would require far more comprehensive measures than are now contemplated by the NRC, and these

Continued on page 10

Environmental Briefs

A summary of recent events in the area of science and environmental regulation.

Energy Policy: (Nuclear Power) Front-page stories the weekend of August 12 and 13 heralded a "major advance" in the development of nuclear fission at Princeton. But the Department of Energy stated that no breakthrough had been achieved and that it will be at least 50 years before research into nuclear fission produces results. The scientific community is divided over the significance, if any, of Princeton's achievement. (*Science*, September 1)

The Nuclear Regulatory Commission (NRC) on August 10 gave permission for continued construction of the Seabrook Nuclear Power Plant. Over the strong objections of the regional Environmental Protection Agency (EPA) staff and the U.S. Fish and Wildlife Service, EPA Administrator Douglas Costle ruled that the Seabrook cooling system will not harm marine life. The New Hampshire Audubon Society and the New England Coalition on Nuclear Pollution are appealing his decision, and the Clamshell Alliance plans to continue its program of nonviolent civil disobedience. (*Science*, August 25)

On August 17 Wisconsin became the fourth state to limit further nuclear power plant construction and planning. For CBE's role in obtaining this moratorium, see the CBE Briefs in this issue. (*Environment Reporter*, August 25). . .The Task Force Against Nuclear Pollution Inc. has gathered 750,000 signatures on petitions asking for a phase-out of nuclear power and development of solar. The signatures, which totaled a high of 119,266 in New York and a low of 236 in South Dakota, have been sent to Congress. (*Chemical & Engineering News*, September 4)

Gulf States Utilities Company announced that it is canceling two planned nuclear generating units at its Blue Hills site in East Texas at a cost of about $25 million. The company said that although an 11% yearly increase in peak electricity demand was anticipated when the units were planned in the 1970s, demand has fallen and the company projects only a 5.0 or 6.0% annual increase. (*The Wall Street Journal*, August 11)

(Coal) A report released by the Illinois South Project, Inc., shows that six energy corporations now own 314,824 acres of Illinois farm land in 35 coal-bearing counties. The report states that companies are not paying an appropriate share of the property bill, however, indicating that the value of the land has been downgraded, particularly through strip mining. Among the biggest Illinois landholders are Peabody Coal, Midland Coal, Exxon Corp., Standard Oil of Ohio, Commonwealth Edison, and subsidiaries of Continental Oil, General Dynamics Corp., and Ashland Oil Corp. (*Chicago Tribune*, August 24)

Toxic Substances: (Radioactive Materials) Nuclear Engineering Company (NECO) has threatened to abandon its Sheffield, Illinois, low-level radioactive waste disposal site because of difficulties in getting the site expanded. The current 1.35 acre site was effectively shut down last February when 18,000 cubic feet of NRC-licensed disposal space. NRC officials say the commission is requiring more information than in the past to license additional space because the Sheffield site is also under the National Environmental Policy Act. Illinois Attorney General William Scott is suing to have the site closed altogether. (*Nucleonics Week*, August 24)

The General Accounting Office (GAO) has issued a report recommending tighter NRC regulation of low level waste treatment systems at reactors and suggesting that without federal action to reduce volume of waste produced, available disposal sites could run out by the mid-1980s. The GAO noted that waste treatment systems at nuclear power plants "are not reviewed to the same degree as 'safety systems' by NRC because they are not considered as significantly affecting public health and safety." But the report says reactors have suffered numerous problems with such systems. (*Ibid.*)

A report by the National Academy of Sciences has found severe drawbacks in what is now the best regarded technique for storing radioactive wastes. "Vitrification" — immobilizing the wastes in glass — is neither as stable nor as permanent as had been thought, according to the report. The Department of Energy now has 265,000 metric tons of highly radioactive wastes in temporary storage, awaiting discovery of a "safe" method of disposal. (*Science*, August 18)

(Hazardous Wastes) President Carter declared an emergency under the Disaster Relief Act in the Love Canal section of Niagara Falls, N.Y., where at least 10 known carcinogens are leaking into the environment from an old hazardous wastes landfill. (*ER*, August 11). . .A Circuit Court has ordered Earthline Corporation to remove thousands of barrels of hazardous wastes buried at a landfill in Wilsonville, Illinois. The site had been approved by Illinois EPA, which found that the site was "impervious." But Wilsonville residents, acting with the Illinois Attorney General, convinced the judge that toxic substances are leaking from the site. This is apparently the first time a court has ordered hazardous wastes removed from a landfill. (*Chemical Regulation Reporter*, August 25.)

Pollution Control: A federal Task Force on Environmental Cancer and Heart and Lung Disease has found that "the environment we have created may now be a major cause of death in the United States." There has been a five-fold increase in deaths from the three conditions since 1900. Together they accounted for 59% of all deaths in 1976, as opposed to 12% in 1900. The estimated cost of these diseases is $68 billion a year. (*ER*, August 18)

Air Pollution: An EPA report has found "dramatic" declines in visibility in urban-suburban and non-urban areas of the northeastern United States (including Illinois, Tennessee, New York, and North Carolina) in the last 25 years. Visibility degradation is thought to be related to some of the most damaging effects of air pollution. Minimum visibility now occurs in the summer. (*ER*, August 25). . .An EPA case study of the Houston-Galveston area has found that the area can meet federal air pollution standards and still double its production. EPA estimates that this would be possible with: tight controls on existing pollution sources, best available controls on new sources, traffic growth management, and automobile inspection, if industry could produce a "marginal" improvement in today's control technologies. (*ER*, August 4)

Nearer Than Browns Ferry

A 270° crack in its reactor piping may have brought the Duane Arnold Nuclear Plant closer to a meltdown accident than did the renowned fire at the Browns Ferry Nuclear Plant in 1975.

by David Dinsmore Comey

Until recently, the March 22, 1975, fire at the Browns Ferry Nuclear Power Plant near Decatur, Alabama, was the closest the American nuclear industry had come to a major accident at a civilian nuclear power plant. The fire destroyed the reactor control circuits, starting a "boil-off" of primary coolant in the reactor core. At the same time, it disabled emergency core cooling systems. Fortunately, the "boil-off" was halted before a core meltdown began.

On June 17, 1978, however, the Duane Arnold Energy Center in Cedar Rapids, Iowa, came closer — according to industry experts — to a "loss-of-coolant" accident than did Browns Ferry in 1975. This incident has received very little media attention.

On June 17, 1978 reactor operators were testing the control valves on the Duane Arnold Center, a 538 megawatt boiling water reactor operated by Iowa Electric Light and Power Company. Suddenly, because of problems with electrical relays in the reactor protection system, the reactor accidentally shut down. Only then, when an inspection of the reactor drywell was made, was it discovered that a primary coolant pipe was leaking from a four-inch long crack.

The leaking pipe was one of eight 10-inch diameter pipes used to transfer cooling water from the recirculation system to the jet pumps inside the reactor. The crack was located in a section of the pipe known as a "safe end forging" that joins the pipe to the inlet nozzle of the reactor pressure vessel. This safe end, located near the bottom of the reactor core, is a highly undesirable location at which to have a pipe break. A design basis accident analysis performed by the U.S. Nuclear Regulatory Commission (NRC) states that "a complete circumferential break of one of the recirculation loop pipes would result in the worst 'loss-of-coolant' accident possible at a boiling water reactor."

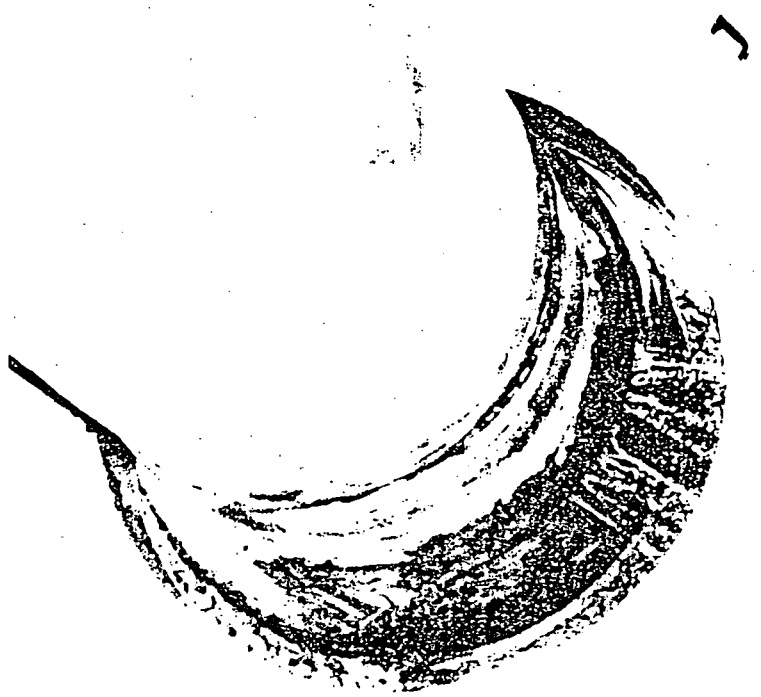
The leak continued even after the reactor was de-pressurized. (See accompanying photo.) As a result, the reactor was cooled down and the fuel in the reactor core was removed to the spent fuel pool. Radiographic and ultrasonic testing showed that, although the visible crack was four inches long, this crack actually extended approximately 270 degrees around the circumference of the pipe. When the other seven recirculation pipe safe ends were radiographed and ultrasonically tested, all seven were found to be cracked to some extent, four had significant indications of intermittent cracking around their entire circumferences.

As of this writing, all eight safe ends are scheduled to be replaced by newly designed forgings being fabricated at Coulter Steel and Forge Company in Berkeley, California. The plant cannot be restarted before late October, and the utility estimates that repair costs will be about $2 million. The Iowa Commerce Commission estimates that Iowa Electric will probably spend more than $15 million to purchase power from other utilities while the plant is shut down. The Commission's chairman, Morris Van Nostrand, says he expects the utility to make an "aggressive" attempt to recover repair costs from General Electric.

The original safe ends were manufactured by Lanape Forge in Pennsylvania, under subcontract to Chicago Bridge and Iron, which in turn was a subcontractor to General Electric, the reactor manufacturer. A drawing error caused machinists at Lanape to cut a groove that was 3/8 of an inch too deep around each pipe. These grooves were then filled in with weld metal. Records at Lanape, CB&I, and GE show that these repairs were approved as meeting required safety codes.

An NRC official says, "Quite obviously we weren't aware of the repairs, and

At CBE, we call this a picture of the world's first nuclear shower. Water spurts from the reactor pipe even after the reactor has been depressurized.



no one here is happy repaired parts were used." But an NRC inspector says that the repairs would have met even the more stringent safety codes in force today.

Because the three companies involved in fabricating the safe ends at Duane Arnold manufactured similar fittings for the Brunswick Nuclear Plant near Wilmington, North Carolina, which is owned by Carolina Power and Light, CBE has questioned whether Brunswick might not suffer the same problem as Duane Arnold. Because the safe end walls at Brunswick are approximately one-inch thick, however, while those at Duane Arnold are only ½-inch thick, the NRC believes that Brunswick shows no cause for concern. All GE nuclear power plants other than Brunswick use a different safe-end design from that at Duane Arnold.

But it is worth noting that, at another GE plant, approximately two months before the incident at Duane Arnold, an unscheduled inspection conducted on April 26, 1978, during the refueling of the Cooper Station of Nebraska Public Power south of Omaha discovered indications of cracking on three of the recirculation loop pipes where the safe-end welds join the nozzles. The defects were ground out without violating minimal wall thickness codes, and the NRC has accepted the repairs as satisfactory.

The NRC still does not know why the safe ends at Duane Arnold cracked,[3] even though the repairs made to the improperly machined piping met both past and present code requirements.

Fortunately, neither the Duane Arnold or Cooper reactors were operating when the cracks were discovered. We may not be so lucky the next time.

FOOTNOTES

[1] Details may be found in David D. Comey, "The Incident at Browns Ferry," *Not Man Apart* September 1975, reprinted in Peter Faulkner (ed.), *The Silent Bomb* (N.Y., Random House, 1977).

[2] *Preliminary Safety Analysis Report, Bailly Generating Station Nuclear 1*, p. 14.6-12.

[3] The NRC has obtained one of the cracked safe ends and sent it to Battelle Memorial Laboratory in Columbus, Ohio for destructive testing that may reveal the cause of the cracking. This testing will be an independent check on the testing being performed for Iowa Electric at Southwest Research in San Antonio, Texas.

Civil Liberties *Continued from page 7.*

measures would be expensive. But nuclear facilities could be turned into impregnable "fortresses." If this were the case, there would be no necessity of conducting surveillance in order to be aware of potential threats; any attack could be repelled.

"Is it better to torture a suspected terrorist than to let a city go up in flames?"

Such measures would not, however, protect against the possibility that an employee might smuggle in explosives or override safety devices in such a way as to cause a reactor to melt down or a waste storage facility to disperse its radioactive contents over a wide area.

In order to protect against potential sabotage from within the facility, the NRC recently proposed an "accession authorization program" for employees at nuclear power plants. The program would include "background investigations as to character, associations, and loyalty, conducted under standards and specifications established by the Commission." Employees would be subjected to "full-field background investigations" by the Federal Bureau of Investigation and other agencies, in which past fellow employees, landlords, personal and professional acquaintances, neighbors, and intimate personal relations would be interviewed. Other methods of investigation being discussed would include psychological testing, clinical evaluation, and polygraph examinations.

Mr. Shattuck, in his testimony on behalf of the ACLU, said that most of these proposed measures are infringements or violations of protections now guaranteed by the Constitution and by case law. The NRC has estimated that more than 21,600 people will be subject to such investigative clearances by 1985, and Mr. Shattuck characterized this number as "alarming." He said, "The proposal would set a dangerous precedent by extending a security clearance system historically confined to sensitive government positions to an entire industry, thereby broadly affecting the private sector." He proposed that the NRC seek less intrusive, "non-investigative safeguard measures which would not undermine the Constitutional rights of nuclear industry employees."[5]

The ACLU position seems to be that it is possible to operate a major nuclear power program and still protect the civil liberties of the people employed in this program. But I disagree. Only thorough investigations will protect against the possibility of sabotage from within a nuclear power plant and the loss of hundreds of thousands of lives. This situation can be described in the same terms used by Russell Ayres with respect to a plutonium economy: To protect the public it is necessary to deny the civil liberties of a significant segment of the population.

The ACLU calls the NRC's security proposals "alarming."

Nuclear power thus represents a threat to our civil liberties as great as any other this country has faced. The many other drawbacks and hazards of nuclear power have become obvious in recent years. But on civil liberties grounds alone, nuclear power deserves to be abandoned.

Footnotes

[1] David D. Comey, "Nuclear Power: the Ultimate Internal Subversion", December 1975 luncheon address to American Bar Association, Washington, DC; also David D. Comey, "Die sozialen Zwänge der Kernenergie", in: *Kernenergie* (Frankfurt am Main, Fischer Verlag, 1976), pp. 122-138.

[2] David D. Comey, "The Perfect Trojan Horse," *Bulletin of the Atomic Scientists*, June 1976, p. 34.

[3] Russell W. Ayres, quoted in *Chicago Daily News*, Nov. 29, 1975, p. 3. See also his "Policing Plutonium: The Civil Liberties Fallout," *Harvard Civil Rights — Civil Liberties Law Review*, Vol. 10, No. 2 (Spring 1975), pp. 369-443. (Reprints may be obtained for $3.00 from William S. Hein, Inc., 1285 Main Street, Buffalo, NY 14209).

[4] Russell W. Ayres, quoted in *Washington Post*, Nov. 17, 1975, p. A24.

[5] John H.F. Shattuck, "Testimony of American Civil Liberties Union," June 8, 1978, Docket No. RM-50-7, U.S. Nuclear Regulatory Commission, Washington DC 20555.

Citizens for a Better Environment
Suite 502, 536 W. Wisconsin, Milwaukee, Wisconsin 53203
Main Office: Suite 2610/59 E. Van Buren, Chicago, Illinois 60605

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CBE Warns Public on Danger of Pesticide

Explosion at Stauffer Chemical Exposed Surrounding Community to EPN

On Friday, August 18, at 8 a.m., an explosion ripped through the Stauffer Chemical Company facility located in Chicago Heights, Illinois. The shock from the explosion was felt as far away as five miles. A mushroom cloud was sighted immediately after the blast, and this cloud drifted to the North-Northeast, over the surrounding community. A temperature inversion was present in the area from Thursday night through Saturday morning, which prevented the dispersion of the many chemical substances that had been released in the explosion.

Two persons died as a result of falling debris, and 59 persons were hospitalized as a result of inhaling toxic fumes which must have included EPN, a highly toxic pesticide that was being manufactured at the Stauffer facility. Two thousand, five hundred gallons of EPN are thought to have been released as a result of the explosion, along with nitrophenol, formaldehyde, hydrochloric acid, sulfuric acid, phosphoric acid, and other solvents.

The liquids released from the blast were diverted to a nearby creek, which was quickly dammed up to prevent the liquids from contaminating the Little Calumet River. State tests indicated that the levels of EPN in this ditch-bank controlled area were less than 1 part per million (ppm) on Friday; the levels of EPN in the air near the blast site are not known at this time, but 0.5 miles away the levels in the air were less than 1 part per billion (ppb).

EPN is an organophosphorous insecticide, structurally related to Phosvel and TOCP. Acute effects from EPN exposure include breathing difficulties, gut cramping, skin irritation, and paralysis. The long-range effects of EPN include: progressive deterioration of the myelin surrounding the central nervous system neurons, hyperreflexivity of the upper and lower limbs, depression of the Babinski reflex, spasticity, eye tremors, muscular weakness, ataxia, and sensory loss.

The media reports of the blast did not mention long-term effects of EPN exposure. As a result, on Sunday, August 20, Eileen Choffnes, a CBE staff scientist, gave an exclusive interview to the NBC-affiliate station in Chicago about the chronic health hazard to humans from EPN exposure. Stauffer Chemical Company confirmed the toxicity of EPN, but minimized the human hazard.

The story was carried in the *Chicago Tribune*, *Chicago Sun-Times*, *Washington Post*, numerous suburban newspapers, local radio stations, and all local network affiliates. The wire service story, carried by the Associated Press, was published as far away as Wyoming.

CBE is now exploring various avenues through which to obtain funds for a health evaluation of the persons exposed to EPN as a result of the Stauffer explosion. Representatives of the Oil, Chemical, and Atomic Workers Union, which represents the Stauffer workers, are cooperating in this endeavor.

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Offices:

BERKELEY: Suite 404
2131 University Avenue
Berkeley, California 94704
415—549-3900

CHICAGO: Suite 2610
59 East Van Buren
Chicago, Illinois 60605
312—939-1984
(Research: 312—939-1530)

MADISON: 2 West Mifflin
Madison, Wisconsin 53703
608—251-2804

MILWAUKEE: Suite 502
536 West Wisconsin Avenue
Milwaukee, Wisconsin 53203
414—271-7475

NEW YORK: Suite 425
25 Broad Street
New York, New York 10004
212—425-3553

SAN FRANCISCO: Suite 600
88 First Street
San Francisco, California 94105
415—777-1984

WASHINGTON: Suite 200
1341 G Street, N.W.
Washington, D.C. 20005
202—347-1132

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Editor: Flora Johnson
Circulation Manager: Pat Treanor
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Cover Photo: Only extensive investigations will protect nuclear facilities, such as Zion Station near Chicago, Illinois, against the possibility that an employee might smuggle in explosives or override safety devices. Photo by David Dinsmore Comey.

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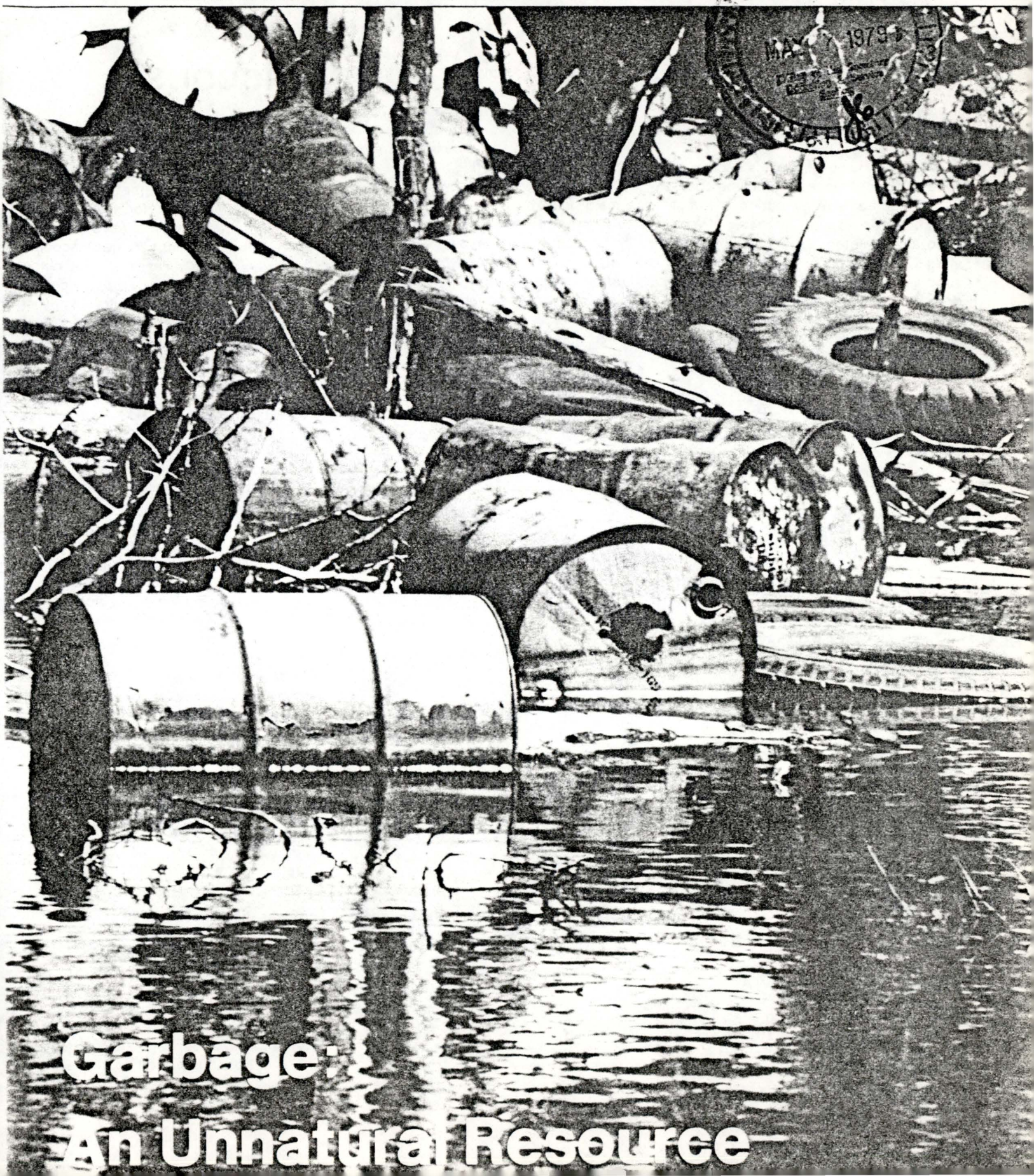


Garbage: An Unnatural Resource

CBE Briefs

National

Energy Policy

CBE staff members made a number of speaking appearances around the country on nuclear energy during the last month. David Comey debated Ralph Lapp at the Hotchkiss School in Lakeville, Connecticut, at the school's environmental conference, and later addressed the Clamshell Alliance and made television appearances in New Hampshire on behalf of the protestors against the Seabrook nuclear power plant.

On October 14, staff physicist Peter Cleary spoke to the North East Ohio Teachers Association at Perry, Ohio on the environmental hazards presented by nuclear power. On October 27 and 28 he debated George Travers of Commonwealth Edison at the University of Illinois at Champaign-Urbana. The debate was divided into two sections, with the overall topic being "Nuclear Energy as a Power Source." At an energy symposium at Hiram College, Hiram, Ohio, on November 2, he both lectured on "Energy for the Indefinite Future" and took part in a panel discussion of nuclear power.

Toxic Substances

CBE staff scientists Dana Davoli and Eileen Choffnes attended an ASTM meeting in Cleveland October 31 and November 1 on aquatic toxicology testing.

Illinois

Energy Policy

Edison Rate Hike

The Illinois Commerce Commission cut Commonwealth Edison's request for a 14.5% ($279.5 million) rate increase in half, granting instead a boost of 7.64% ($150 million). The commission's decision, announced October 12, ended 10 months of hearings in which CBE was a prominent participant. The Commission also made numerous reductions in the company's rate base, totaling $332.1 million: thus a more accurate figure for the increase Edison actually received would be $110 million.

The Commission's decision will have a major impact on the company's planned expenditures for construction. Throughout the proceeding CBE argued that Edison's planned construction budget was excessive. The Commission eliminated construction work in progress, land, and other improper inclusions in the company's proposed rate base, and this decision further reduces Edison's ability to continue their planned level of construction ($4.6 billion over the next five years).

In the past Edison has routinely received 85 to 95% of their requested rate increases. The Commission's decision reflects strong citizen intervention in the hearings and also the effect of Sunshine Laws, adopted recently in Illinois, which open ICC Commission hearings to the public.

Air Pollution

Commonwealth Edison Variance Request

CBE has intervened in Commonwealth Edison's request to the Illinois Pollution Control Board for a variance for its 1700 megawatt Powerton Station near Pekin, Illinois. The plant does not comply with state emission standards for large stationary sources. Although Edison and the Illinois EPA have entered into a voluntary agreement to install a small 425 megawatt scrubber system on one boiler, and to select by 1980 the method the plant will ultimately use to achieve the required emission reduction, certain provisions of the Clean Air Act of 1977 now require that non-complying sources achieve final compliance with state regulations by July 1, 1979, or face a non-compliance penalty.

Wisconsin

Energy Policy

Advance Plan Hearing Testimony

CBE executive director David Comey was cross-examined for two days in early October by Wisconsin utilities on his pre-filed testimony in the Wisconsin Public Service Commission's Advance Plan hearing. Mr. Comey's 51 pages of testimony dealt with the vulnerability of nuclear power plants to sabotage and their basic unreliability and poor economics.

Water Pollution

Public Participation in the Water Pollution Control Act

CBE has written to Douglas Costle, Administrator of the U.S. Environmental Protection Agency, protesting "exceptionally distressing matters relating to public participation in EPA and Wisconsin State WPCA programs" and calling for a meeting between the appropriate officials and Wisconsin environmental groups to avert further deterioration of the situation.

The letter states that Wisconsin has denied any form of public participation in P.L. 92-500 enforcement actions, as a result of which citizens are not able to commence, intervene, or comment on any enforcement action at the state level.

CBE's letter details instances in which the state has failed to provide the opportunity for meaningful public participation in the enforcement of WPCA.

Sewer Interceptor Lines

On October 27 CBE filed an administrative appeal with George Alexander, Regional Administrator of the Environmental Protection Agency, regarding an EPA decision that would allow six sewer interceptor lines to be constructed without an environmental impact statement. CBE opposes the addition of the interceptor, saying they will add to the flow of untreated sewage into Lake Michigan.

What Happened to Recycling?

In 1985, Americans will produce 200 million tons of garbage, and at least 165 million tons of that is supposed to be used for landfill. But there may be no space left for landfill in 1985. Energy recovery plants are the answer only if you believe that cities should be committed to producing waste.

by Flora Johnson

Somewhere around Earth Day, 1970, the word "recycling" entered the language. For a few years thereafter conscientious Americans bundled newspapers and saved bottles and cans, turning them in to recycling centers. These people hoped they could, in this way, do their part to conserve the Earth's resources and save us all from drowning in garbage.

Seven years later, "recycling" is an established catchphrase — as in "please *recycle* this membership application to a friend." But not-wasting, which may be a better word, has not become a way of life for most Americans.

The recycling centers established around Earth Day found that citizens soon began to lose interest in sorting and delivering their own garbage. Their worst crises came two to three years ago, when the recession destroyed the market for recycled material, especially paper, and many went out of business. The new phrase is "resource recovery," which includes not only private recycling efforts but also big, expensive ways of dealing with waste — from mechanical sorters to facilities that burn garbage for energy.

The problem remains. In 1973 Americans threw away 144 million tons of garbage; in 1977 we have produced roughly 160 million tons, and the Environmental Protection Agency projects that figure at 200 million tons in 1985. Collection and disposal of this garbage currently costs about $4 billion; it may go as high as $10 billion by the 1980s. Already, for our nation's largest cities, waste-disposal costs are second only to those for running the public schools. In 1973 the National League of Cities declared garbage to be the number one urban problem.

In 1976, largely in response to pressure from the cities, Congress passed the Resource Conservation and Recovery Act (RCRA). This act mandates several branches of government, the EPA in particular, to address themselves to the problem of solid waste disposal. It also calls for an unusual degree of public participation in the implementation of its provisions. This process is only now beginning to take place.

In this issue of the *Environmental Review* we take a brief look at the alternatives now available to us for resource recovery, and we have put together a fact sheet for those interested in taking advantage of the public participation provisions of the Resource Conservation and Recovery Act.

Energy from Waste

The National Center for Resource Recovery has estimated that municipal waste alone could be used to generate some 790 trillion BTUs a year.

That is the dream many of us have been lead to believe will come true: Huge "garbage gobblers" would separate out some valuable resources, like aluminum, and incinerate the rest in ways that create badly-needed energy.

But these plants are expensive, costing from $5,000 to $50,000 per ton of daily capacity. As a result such operations seem to attract only the largest corporations: A 1976 MITRE Corporation study, commissioned by the EPA, found that in 1973 the 20 largest resource recovery firms had combined revenues of $23 billion and assets of $18 billion. These companies expect to make a profit from garbage: The study found they expected a 15% return on their investment.

The Resource Conservation and Recovery Act recognizes that resource recovery companies have the right to protect their investment by binding cities to long-range contract. In Milwaukee, for example, The Americology Division of American Can Company recently completed an $18,000,000 plant which uses the Refuse Derived Fuel (RDF) system, burning city waste with coal to produce steam. Americology can renegotiate its contract with Milwaukee any time there is a change in the composition of the city's trash. The city is required to deliver at least 250,000 tons of trash a year and pay a set fee for waste disposal no matter how much waste is delivered to the facility.

This sort of arrangement raises the spectre, at least, that cities will one day be caught in the ironic situation of *having* to produce garbage in order to feed their enormous, expensive resource recovery plants. It is also possible that large corporations might one day oppose attempts at waste reduction, in order to protect their profits. Fortunately, there is not likely to be any shortage of garbage at any time in the near future.

For our nation's largest cities, waste-disposal costs are second only to those for running the public schools.

The big resource recovery facilities also face practical problems, and these cover the usual span, starting with the ridiculous: In Chicago, the Northwest Incinerator is a "waterwall" plant which cost $8,300,000. Waterwall is a technique that has been widely applied in Europe and is considered commercially available by the EPA, and it is another method of burning garbage to produce steam. Unfortunately, although the Northwest Incinerator was completed in 1972, the city has not yet been able to find a market for the steam — which is

Flora Johnson is the editor of the CBE Environmental Review.

condensed on the plant's roof and returned to the boilers.

Chicago also has a recently completed RDF plant which supplies energy to Commonwealth Edison. The Supplementary Fuel Plant is considered to be one of the most advanced in the world, and features very advanced environmental controls. Unfortunately the result, according to officials in the U.S. EPA, is a "very sensitive system requiring a great deal of fine tuning" — which has yet to operate near its planned capacity.

Despite their problems, both RDF and waterwall systems are looked on favorably by most observers, who feel that they can be made to work. Another promising technology is called pyrolysis, in which the waste is heated in the absence of oxygen and converted to a gaseous or liquid fuel. But pyrolysis is not yet available for commercial use.

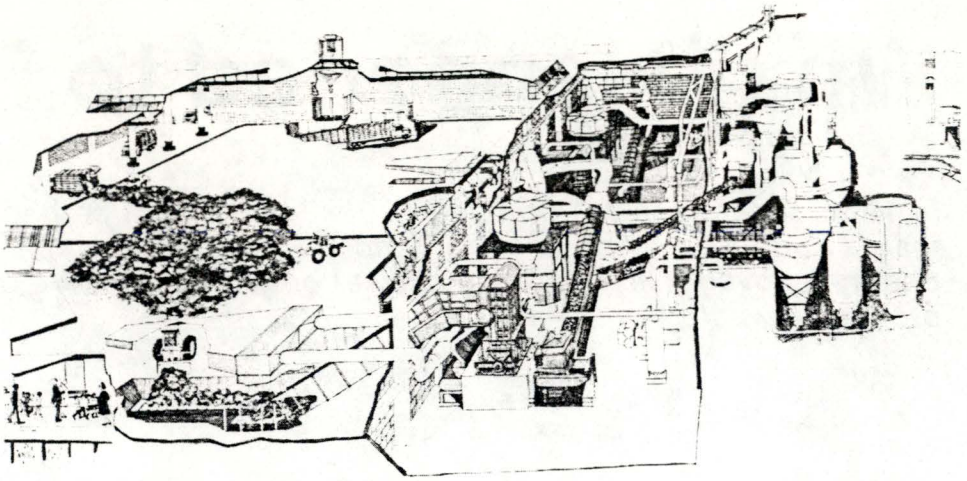
No one, however, looks upon these plants as an answer to our short-run problems. In 1975, according to the EPA, the thirteen energy recovery plants then operational processed not more than 300,000 tons of waste. At the current rate of implementation, the EPA projects that energy recovery plants and mechanical separating plants *together* will handle only 10 to 20% of the nation's waste in the next decade.

Raw Materials from Waste

Making newsprint from recycled paper requires some 12 million BTUs less per ton than manufacturing paper from virgin wood pulp. Steel produced from scrap consumes 74% less energy than steel from ore. Aluminum can be recycled and processed for 5% of the energy it would take to make it from ore. It has been estimated that shifting from throwaway bottles to returnables would save 225 trillion BTUs a year.

In short, burning garbage to make energy is not really energy-efficient. Alas, the process that *is* energy efficient requires that solid waste be sorted — ferrous metals from aluminum from colored glass from clear glass from paper. And technological means for accomplishing this sorting do not yet exist. In fact, they may never exist.

The Americology Plant in Milwaukee is currently testing methods for recovering non-burnable wastes, particularly aluminum. Finding such a technique would be a boon to the parent company, American Can. In Chicago, however, those portions of the waste that cannot be incinerated are used for landfill.



An interior view of Chicago's Supplementary Fuel Plant, one of the most advanced such systems in the world. After the waste is shredded into small pieces, a strong current of air is used to separate light from heavy fractions. Ferrous materials are separated by a magnet, while metals, glass, and ceramics are used for landfill. Light material is shredded again and stored until it is needed to feed the plant's furnaces. (Illustration courtesy of Chicago Public Works.*)*

So far, only the ferrous portion of our garbage can readily be extracted. An ordinary magnet attracts iron, but the Eddy Current Separator, or "aluminum magnet," is entirely experimental. Methods that have been tried for glass recovery and sorting have worked even less well. In its Third Report to Congress, the EPA stated that the technological and economic viability of mechanical separating techniques is uncertain.

In trying to devise solid waste policy for the future, the EPA and other government agencies are now asking if a significant number of private homes could be convinced to return to the Earth Day ethic of sorting and recycling their own waste. There are currently more than 100 "source separation" systems operating in the country. In most of them, pre-sorted household, office, and business garbage is picked up by the recycling center at the source. Most of these centers now have paid staff and are on a money-making, if shaky, basis. Some are neighborhood-based, others city-wide, rural, small town, and suburban. Some are private, others public, others non-profit. There is at least one co-op.

The two best-known of these projects are in two towns in Massachusetts — Somerville, a blue-collar community, and Marblehead, an affluent suburb of Boston. Both communities passed ordinances requiring the separation of refuse; both pick up the pre-sorted garbage from people's homes. So far the projects, which have been in existence about two years, have given widely varying results. By the end of 1976, only 8% of the garbage in Somerville was being separated at the source, while the figure was 25% in Marblehead. Somerville lost approximately $1,825 on its system while Marblehead earned $27,760.

Source separation recycling is unquestionably the least expensive system — to the taxpayer. In addition, the Institute for Local Self-Reliance has estimated that such systems can make money, if at least 10% of the residents of a given community participate. The EPA has estimated that such systems could process up to 50 million tons of waste per year.

But the EPA currently projects that source separation will handle about 15 million tons of waste in 1985.

Altogether, the EPA estimates that, at the current rate of implementation, thermal and mechanical processing plants will handle only 10 to 20% of the nation's waste in the next decade. Source separation will handle up to 10%, and waste reduction a similar amount. The U.S. is *still* expected to have 165,000 tons of garbage left to dispose of in 1985. Currently our only option is to bury it.

A list of local environmental organizations, including recycling centers, may be obtained from the Institute for Environmental Quality, 309 West Washington, Chicago, Illinois 60606.

Two Contemporary Recyclers

In 1969, students from the University of Chicago began a recycling center on Chicago's South Side. Like many of the recycling centers that were founded in the ecology-enthusiastic early 70s, this center soon found community involvement beginning to decline. "It became clear that we weren't going to save the world by recycling our bottles," says Ken Dunn, who runs the Resource Center in Hyde Park.

Dunn's reaction was to broaden the Resource Centers activities, adding a free store where clothes, books, and industrial materials could be exchanged; a whole-grain bakery; a woodworking shop; and shops for repairing old bikes and autos. With increased activity around the center, it was easier to keep community members interested, and easier to find help when it was needed. "People who had come in to do other things," says Dunn, "would take time out to help sort garbage."

Six years ago Chicago's north shore suburb of Skokie had two recycling operations, Niles Township High School Reclamation Center and the North Shore Ecology Project. George Brabec, who directs these now-combined operations, says, "About two or three years ago when the recession hurt the market for recycled goods, we unified the two centers and in addition took over a number of other small recycling operations on the North Shore. That helped us lower our expenses. We also need less staff."

Brabec is enthusiastic about the willingness of people in his community to sort and recycle their waste. "Last July the volume of materials coming into the high school became so great that we had to ask people to do their own sorting, whereas we had done it for them," he says. "But there was no decrease in the volume of material coming in." He estimates that his operation may be handling from 80 to 90 tons of garbage a week. It's making money, which in turn is used to make the operation more efficient. They now own their own trucks and storage facilities, for example. "This fall the market is good because a new method of making insulation has been developed which uses shredded newspaper, treated with fire retardant. But that trend won't last," he warns. He notes that the profitability of recycling operations is subject to wide fluctuations in the market.

Ken Dunn, of the Resource Center in Hyde Park. (Photo by Marc Pokempner.)

"I'd rather have this be a place where people realize that producing all this garbage is absurd."

The Resource Center is now handling about 40 tons of garbage a week, and Dunn notes that, because Hyde Park is an unstable university community, it is difficult to expand the number of people participating in the center. Making money is not very important to the center's operation. "The problem with consumption," says Dunn, "is that it's not self-limiting. But when people recycle their own garbage they have an opportunity to monitor their own habits of consumption." He tells a story of a woman who brought a bag of liquor bottles to the center each week for recycling, until one day she noticed how much liquor she was consuming.

"This kind of recycling operation is certainly not an ultimate solution," says Dunn. "There is no ultimate solution."

George Brabec says, "I don't believe our type of operation is a total answer. I look at it as a stopgap measure, until more advanced systems are developed. One day I assume private industry will operate resource recovery systems for profit." He adds that mechanical separation is "too complex" and that he thinks the future lies with energy recovery.

Dunn also considers mechanical separation unworkable. "We will have to find ways to keep those materials out of the waste," he says. "The rest is combustible, and I suspect that is how it will be disposed of, even though I question if we should use high-grade paper fiber for heat.

"But I want people to learn about the problems of energy and materials," he says. "At the Resource Center we've started to form a sort of alternative community. We're trying to develop a lifestyle that's more consistent with a limited planet. We try to eat low on the food chain and not to be wasteful in other ways.

"I'm interested in keeping all this on a human level. I don't believe that, ultimately, we can solve our problems with technology. Rather than have this be a place that deals with garbage efficiently, I'd rather have this be a place where people realize that producing all this garbage is absurd."

Public Participation in the Resource Conservation and Recovery Act: A Fact Sheet

The Resource Conservation and Recovery Act of 1976 is an ambitious piece of legislation: Reporting on the Act, the House Interstate and Foreign Commerce Committee spoke of it as closing "the last remaining loophole in environmental law." The committee went on to say, "At present the federal government is spending billions of dollars to remove pollutants from the air and water only to dispose of such pollutants on the land in an environmentally unsound manner."

CBE Staff Attorney Bill Forcade, who has testified for CBE at public meetings on RCRA, says that now is the crucial time for citizens to become involved in the implementation of the Act. This is particularly important because the Act gives the administrators great discretion in determining how to implement its provisions.

Much of the responsibility attached to this legislation falls on the Environmental Protection Agency, although it is not clear that the EPA has the resources and personnel required to implement the Act. Already the EPA has missed the first deadline imposed under the Act, blaming "confusion within the law" — that is, their own confusion about the requirements of the law — for the delay.

From the standpoint of environmental activists, one of the most important provisions of RCRA is that it allows private citizens to petition an administrator to change the regulations in force in any area covered by the Act. If he refuses the petition, the citizen can sue him in federal court. "This is terribly important," comments Bill Forcade, "because it's so difficult to foresee what we may learn about hazardous substances and other matters covered by the law." Unfortunately, Forcade says, these provisions apply only while RCRA is administered by the U.S. EPA. The public participation guidelines now being proposed by U.S. EPA do not protect the right of citizens once the states take over implementation of RCRA from the federal government. That is citizens are not guaranteed the right to sue in state courts. CBE is currently trying to have such a requirement included in the interim or final public participation guidelines when they are issued, which should be around the beginning of the year. CBE protested strongly when the EPA failed to hold regional hearings on the proposed public participation guidelines earlier this year.

The proposed guidelines also call for public meetings, hearings, conferences, and workshops; advisory committee and review groups; and educational programs. Public participation on a national level has largely been confined to meetings and hearings, however. U.S. EPA maintains a mailing list of interested parties, which is handled by Gerri Wyer, Public Participation Officer, Office of Solid Waste (WH562), U.S. EPA, Washington, D.C. 20460.

The Midwest Regional Office (Region V) of the EPA has opted to work entirely through state agencies, according to officials there. On the state level, Governor James R. Thompson's office has not yet issued a decision as to whether Illinois EPA, the Institute for Environmental Quality, or some other agency should handle the implementation of RCRA. In Wisconsin, public hearings are under way on the regional boundary designations mandated by RCRA, and persons who wish to be kept informed may write to Peter Kmet, Department of Natural Resources, Solid Waste Management Section, P.O. Box 7921, Madison, Wisconsin 53707.

Open Dumping and Sanitary Landfill

Of all the ways in which America can dispose of waste, the first to disappear will probably be the unsightly, unsanitary open dump. The EPA has documented more than 60 cases where dumps have contaminated groundwater with toxic chemicals. RCRA specifically calls upon the EPA to include phasing out dumps over a five year period, in guidelines it must prepare to help the states prepare their solid waste management programs.

RCRA foresees that most of our wastes will go either to depots established specifically for hazardous wastes or to sanitary landfill. Unfortunately, sites suitable for landfill are becoming scarce, and their increasing cost is one of the factors driving up the cost of disposing of municipal waste.

A landfill once completed is suitable only for certain uses, like parks and playgrounds, because of the danger that the fill will subside. Decomposition of the material in the fill can generate methane gas, which can explode — as has happened in Michigan and happened in North Carolina in 1968. Leachate (a liquid that drains from landfill) can contaminate surrounding areas with waste bacteria and toxic substances.

Landfill has become particularly controversial in Illinois, where communities have protested their selection as landfill sites.

Under RCRA, the EPA was mandated by October of this year to have developed guidelines to help state and regional authorities develop solid waste programs. EPA was also to have issued regulations distinguishing dumps from landfills, this to be followed by an inventory of all the dumps in the United States. Ultimately, EPA is supposed to devise regulations covering landfill. EPA now expects to promulgate criteria for dumps and landfill in early December and state and regional guidelines some two months later. Public hearings will follow.

Hazardous Wastes

Reporting on RCRA, the House Commerce Committee listed 59 instances involving hazardous wastes dumped in 20 states, including: 8,000 pounds of ar-

senic in an abandoned factory complex in New Jersey, burial of chromium-bearing plating wastes in New York, and the dumping of hazardous wastes, including cyanides and short-lived radioactive wastes, on Lowry Air Force Base in Colorado, since 1972.

Waste disposal charges would tax products according to the costs associated with their ultimate disposal.

The hazardous waste provisions of RCRA are generally regarded as the most important section of the Act. Public meetings have already been held on these provisions, but they will not preclude hearings to follow the issuing of proposed regulations. The EPA deadline under these provisions is April, 1978.

The EPA must first develop criteria for defining hazardous wastes and also create a list of hazardous wastes. These should be promulgated around the beginning of the year. At the same time, the EPA hopes to propose standards for generators and transporters of hazardous wastes. CBE has suggested that standards for generators be established by creating classes of hazardous waste generators, in a manner similar to the industry-by-industry breakdown of dischargers under the Federal Water Pollution and Control Act Amendments of 1972.

The provisions covering transporters have caused confusion because the Hazardous Materials Act of 1974 requires the Department of Transportation to designate and regulate materials when their transport can pose a health threat. At a public hearing held jointly by the EPA and the Department of Transportation in Rosemont, Illinois, October 26, the agencies heard industry representatives ask them to unify their regulations. The EPA is under pressure from industry to allow the Department of Transportation to enforce these regulations.

RCRA also requires that persons owning or operating facilities for treatment, storage, or disposal of hazardous wastes must have a permit. The EPA expects to propose standards, and a system for issuing permits, in early Spring.

Finally, the EPA must devise guidelines to assist in the development of state hazardous waste programs, and these can be expected in November.

Resource Conservation

RCRA establishes an interagency Resource Conservation Committee to conduct studies and prepare reports to Congress on materials policy over a two-year period. The Committee is to conduct "a full and complete investigation and study of all aspects of the economic, social, and environmental consequences of resource conservation."

The most controversial section of the committee's mandate has to do with proposals that would reduce the amount of waste we generate and possibly remove certain materials from the waste stream. In May, in his environmental message to Congress, President Carter called upon the committee to "address to principal causes of the solid waste problem: excessive packaging and inadequate use of recycled materials." He then called upon the committee to look into one specific proposal — waste disposal charges — and present their findings this month.

The waste disposal charge, or product disposal charge, is one of four methods of waste reduction currently being given wide consideration. It would tax materials and products according to the costs associated with their ultimate disposal, and it is gaining popularity because proceeds from the tax might be used to help municipalities meet the costs of upgrading their waste-disposal facilities.

The other proposals likely to be considered by the committee include design regulation, which would outlaw wasteful packaging, as is now the case in Minnesota; mandatory deposits on bottles and cans (a variation of this proposal would outlaw non-returnable bottles and aluminum cans), such as have been successfully implemented in Oregon, Maine, Vermont, and Michigan but failed to pass the Illinois Legislature this year; and incremental user charges, in which households are charged according to the amount of waste they produce. (San Francisco currently operates such a program.)

The last remaining dream of those who hope that we can one day solve our garbage problem — while we continue to produce increasing volumes of garbage — is that the declining availability of natural resources will make recycled materials more valuable. At some point, they hope, the free enterprise system will support and encourage recycling endeavors, operated on the profit motive alone.

Under RCRA, the Resource Conservation Committee is mandated to look into the question of financial incentives for recycling and the Department of Energy is called upon to research and develop new markets for recycled materials (while at the same time investigating ways to make resource recovery technology more profitable).

However, although there are limited ways in which the government can encourage the use of recycled materials, the prospect that raw materials shortages will soon give boost to recycling efforts is dim. In its January, 1977, report, the National Commission on Supplies and Shortages found that significant materials shortages over the next 25 years, and probably for generations, "will not result from resource exhaustion, but from short-term shocks to the economy."

For the time being, at least, a permanent, satisfactory answer to our solid waste problems awaits changes in the attitudes of the average American consumer.

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Carbon Dioxide: The Warming Trend

Burning fossil fuels has led to a steady accumulation of carbon dioxide in the earth's atmosphere. The resulting increase in the so-called "greenhouse effect" may lead to a significant world-wide warming trend — and an as yet unforseeable impact on world agriculture.

by John Neess

Carbon dioxide is not usually considered a pollutant; it is a natural constituent of the atmosphere, not toxic in the ordinary sense, a product of respiration in nearly all living organisms, and a necessary nutrient for green plants. Carbon dioxide is also a byproduct of fossil fuel combustion — released in proportion to the ratio of carbon to hydrogen in a fuel and roughly in proportion to the amount of energy yielded by the fuel. Natural gas produces the least carbon dioxide per unit of energy yield, coal the most.

Quantitatively, carbon dioxide is a minor constituent of the atmosphere (it is considerably less abundant than argon, for example), but it contributes disproportionately to the so-called "greenhouse effect." By absorbing certain important wavelengths of the outgoing radiant spectrum, atmospheric carbon dioxide helps to hold heat around the globe.

A warming trend would move grain-producing climates to the Yukon, where there are no soils appropriate for growing wheat.

The standing concentration of carbon dioxide in the atmosphere — now at 320 parts per million — has increased by roughly 15% during this century, and the rate of increase has been accelerating. At present levels of fuel consumption (12.8 quads of coal, 32.8 quads of oil, and 20 quads of gas each year), the United States is adding approximately 0.54 ppm per year to this concentration. Thus, we add more than 10 ppm of carbon dioxide every 20 years. (In contrast, the gain from total worldwide consumption of fossil fuels has been approximately 30 ppm for the entire period from 1900 to the present.)

At present rates we can expect the concentration to reach 385 to 400 ppm by the year 2000. If we increase our use of coal, the atmospheric carbon dioxide concentration might double by the mid to late 21st Century.

Rising levels of carbon dioxide in the atmosphere will probably result in corresponding increases in the mean surface temperature of the earth. If carbon dioxide concentrations were to double, we might expect increases in mean global temperature of from 1.5 to 2°C.

All the climatic fluctuations of the last 1,000 years — which have included periods in which changes in climate have had severe effects on agricultural productivity in various parts of the world — have been accompanied by changes in mean surface temperature of no more than 0.75°C above or below the average for the period. (The fluctuations of the last 100,000 years, including a warm, interglacial period; followed by a glacial period; followed by the present interglacial period, were accompanied by changes in mean surface temperature of no more than 5°C above or below the average for the period.)

Some models show that this warming trend would be likely to be greater in polar than in equatorial regions. Among the possible side effects: Glacial ice would melt, raising ocean levels. A change in the volume of snow and ice at the poles would reduce the earth's reflectivity at the poles — which would further increase heat absorption there and accentuate the general warming effect.

Other possible effects of global warming might be shifts of monsoon or desert belts, or northward migration of the principal mid-latitude grain-producing areas, such as those of the United States or Southern Canada. This would have the effect of moving the climactic factors which now support wheat production in those areas to the Yukon, where there are no soils appropriate for growing wheat.

As mean surface temperature increases, so will the surface temperature of the ocean. That will reduce the ocean's capacity to hold carbon dioxide in solution — which, in turn, will add new carbon dioxide to the atmosphere.

In short, continued combustion of fossil fuel could have significant impact on the earth's climate — agriculture in particular. Of course, this impact would not necessarily be unfavorable, and it would vary from area to area and culture to culture. But the time available for human adaptation to the change is likely to be very short. This situation is, at least, risky: World food reserves have been declining for roughly the last 15 years, and as of 1976 stood at no more than about a month's supply.

We have no experience on which to judge what will eventually become of carbon dioxide accumulations in the atmosphere. No present theory adequately covers the fate of carbon dioxide in the major geochemical or biological systems; tells us what the effect of carbon dioxide's newly-established, changing relationship with the ocean will be; or even lets us know at what rate carbon dioxide will react with silicate to

John Neess is a professor of zoology at the University of Wisconsin and a member of the National Academy of Sciences Committee on Nuclear and Alternative Energy Systems. He is a member of the board of directors of Citizens for a Better Environment.

form carbonate (limestone) and quartz (sand) — which is probably the major mechanism for permanent removal of carbon dioxide from the atmosphere. As a result it is impossible to predict accurately how long present carbon dioxide accumulations would remain in the atmosphere, even if all additions of fossil fuel carbon dioxide were stopped immediately.

We do have some idea, however, of how long it takes for the entire volume of the ocean to circulate, bringing it into equilibrium with the atmosphere. On the basis of that knowledge we can speculate that, if all additions of carbon monoxide to the atmosphere were to stop now, it might still require several thousand years to return to pre-industrial levels. It is possible, then, that this process is, for us, to all practical extents and purposes, irreversible.

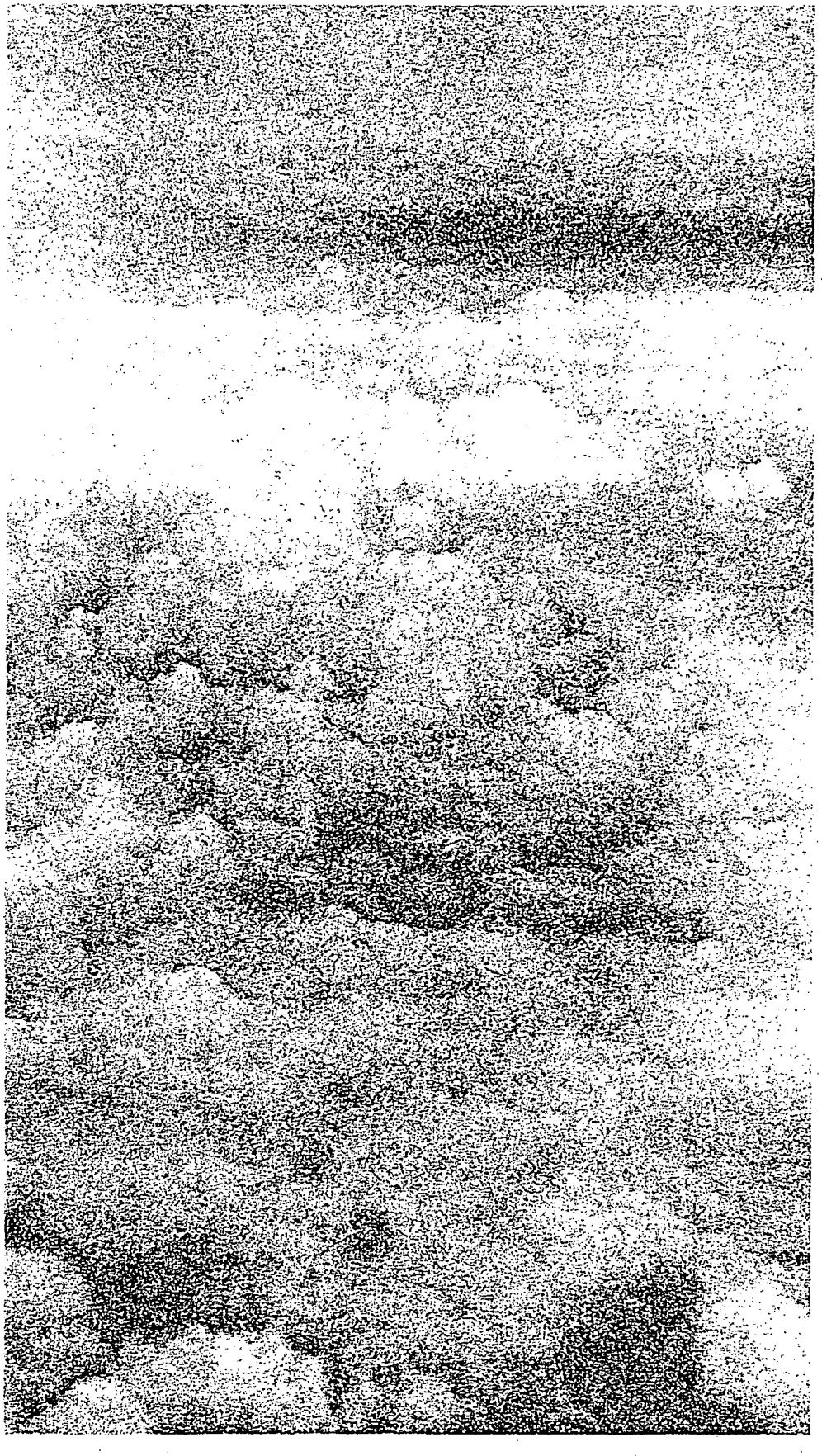
So far, interest in this problem has been largely limited to private expressions of concern among members of the international scientific community. If at some point we were sure that we were experiencing persistent and severe reductions in crop yields in certain parts of the world as a result of carbon dioxide concentrations in the atmosphere, the situation might already be beyond remedy.

Halting combustion of fossil fuels would accomplish little in the short run. Furthermore, without a reserve of non-fossil fuel energy sources, which could readily be substituted for the fossil fuels now in use, it would take decades to achieve any significant reduction in carbon dioxide emissions. That such a strategy could even go into effect assumes that some international institutional structure would exist to provide and implement it. Of course, no such structure exists.

We don't know how long we have before decisive action would need to be taken. But we do know that, once the problem had been recognized, it would take us several decades to respond — long enough for significant and practically irreversible changes in climate to take place.

Archeologists tell us that we would not be the first complex, highly-sophisticated, well-organized culture to disappear because of sudden climatic or other environmental changes.

(Photo by David Dinsmore Comey.)



The New Leaf
for the child in us all

Toys for Environmentally Aware Children

by Flora Johnson

In honor of its being nearly Christmas, we decided to scout our local toy stores for playthings that would — in a not too obviously "educational" fashion — encourage children to appreciate nature and their environment and understand those relationships among living things that we call ecology.

We didn't define this task too narrowly. After all, any toy that helps a child perceive the world with more interest and sensitivity could be called "environmental." But we did add a few caveats familiar to buyers of Creative Playthings: Toys should be beautiful; they should be made with respect for the materials used and with consideration for the child. They should not lock children into repetitious, limited games; instead they should encourage children to amuse themselves by investigating or observing the world around them. In short, toys should not be boring.

Alas, a trip to the toy department at Marshall Field's — one of the biggest in the area — and calls to numerous toy stores uncovered few toys that met our criteria. We found many appeals to current trends — space being popular this year, along with the ever-present dolls made to look like mutant versions of actors on TV. We found many toys that stay interesting only if parents pay for an endless string of accessories. But the few toys we liked seemed to be made by Creative Playthings (the great grandaddy of the educational toy business) or imported from Europe. All these toys tend to be expensive — which is not wrong, but not necessary.

We were beginning to despair when we encountered a treasure trove — our local teacher's supply store. This is where Creative Playthings gets its ideas.

A glass **prism,** for example, is made by Ideal School Supply for schoolroom use, so that a child can learn about the color spectrum. It's $3.45. A somewhat longer, unbreakable plastic prism by Creative Playthings, which knows that children like to play with light, is $4.25, recommended for ages 6 to 10. **Magnifying glasses** in a variety of sizes are $2.55 to $4.55 for school use; Creative Playthings makes "Big I, little i" — reducing and magnifying lenses set in beautiful wood panels, for ages 4 to 7, $12.95. Ideal makes a very professional-looking **stethoscope** for $6.50; the Creative Playthings version (The picture on the box shows two children listening intently at the chest of a very complacent cat.) is $5.50.

Other stocking stuffers from the school supply store include: a **gyroscope,** the scientific version of a top, for $2.35; a **radiometer,** a glass ball in which black and white vanes twirl mysteriously because they are being moved by air heated by the sun, for $3.45; **magnets and iron filings;** beakers and test tubes and other **chemistry lab equipment; compasses** for getting lost in the woods; a **"tele-micro pocketscope"** which combines a "telescope" and a "microscope" in one plastic, pen-like holder, $1.20; and, of course, **art supplies** for do-it-yourself toys.

School supply stores also sell toys with obvious ecological lessons to teach. Those that use live animals can teach insensitivity to nature, however, so proceed carefully:

A **frog hatchery** that comes with a coupon for frog eggs is $9.95 by Natural Science Industries. Unfortunately it doesn't give you a coupon that provides a home for the frogs once they grow up.

An **Ideal Science Bingo** game teaches ecological vocabulary — words like "combustion," "depletion," "sanctuary," and "smog." There are similar bingo games for the animal kingdom and for insects and spiders, each $7.50.

An **aquarium** starter kit is $8.95 from a school supply store, not including the aquarium. Although they are almost perfect for teaching how different species of animals and plants interact, aquariums can get quite expensive and require a great deal of care. Along the same lines, however, Creative Playthings, as well as other manufacturers, makes a **giant ant farm,** for $8.45 (plus whatever it costs to get rid of the ants if they get loose).

An attractive, wall-hanging **Weather Forecaster,** $16.95, will teach that weather, like everything else about nature, is unpredictable.

School supply stores also sell **posters** and other decorative objects, like **mobiles,** some of which do not look as though they come straight from a classroom. Our favorite: "Save the Animals," consisting of 12 big cutouts of members of endangered species, including a huge puma, all for $4.

And of course there are **books.** One that's worth special mention is **Growing Up Green: Parents and Children Gardening Together,** a charming book from Workman Publishers, the people who publish the Kliban Cat cartoons, $4.95.

The best toys that **are** available in regular toy stores teach concepts — new ways of perceiving the environment — or offer tools with which to explore the environment. One such series of toys is imported by Sandecor of London and carried at Noah's Ark stores in the Chicago area. Their toys for infants, all made in France, include **the owl,** a brightly-colored night-time scene that attaches to a bar over a crib. When baby — 7 months or older — pulls the string, an owl pops out from behind a wooden stump. The concept being taught? That the owl is there even if he's not visible to

the baby. (S6.95). For older children, Sandecor imports toys from Value in Play in Sweden. These include, for children 6 years and older, the **Whirly Puzzle** — in which two colors and two shapes make an almost infinite number of patterns (S6.95) — and, for children two to four, **the boatcar** — made of wood and powered by an energy-saving rubber band. (S5.95).

The best set of children's tools is the Creative Playthings **scoop, rake, and digger,** in bright-colored soft plastic. They have been copied by other manufacturers, but none have achieved the simplicity and beauty of design of the Creative Playthings multi-purpose toys — only S3.50.

Thomas Salter Toys makes a **kaleidoscope** that comes with a special container so that you can use anything — bits of plastic, pieces of flowers — to make designs. It's S7.50 at Field's.

For older children, the most appealing tools are "real" ones. The classic, of course, is the **Swiss Army Knife.** Less expensive ones are available, but Hammacher Schlemmer's — 3-1/2 inches long with large and small blades, corkscrew, can opener, small screwdriver, cap lifter, large screwdriver, stripper, reamer, scissors, magnifying glass, Phillips screwdriver, wood saw, fish scaler, hook disgorger, ruler, nail file, metal saw, fine screwdriver, tweezers, toothpick, and key ring — is S39.95. It weighs two pounds.

Along the same lines, don't forget that children love things like **pocket calculators, hammers and saws,** and **tape recorders.** Or, more traditionally, there's always **microscopes** and **chemistry sets.**

Toy departments also sell toys shaped like animals: **Steiff animals,** from Germany, are the most realistic-looking stuffed animals on the market, but expensive. A baby seal, about 4 inches long, is S8. Parker makes **"Nerf critters"** for children 3 to 6. These are squishy alligators, elephants, and hippos on wheels, all related to their "Nerf balls," for S4.25 each. Many toy stores now sell beautiful **wooden animal pull toys** — although we have one young friend who is committed to a shoebox tied to a string, for pulling purposes, and we wouldn't argue with her. The **Victory wood jigsaw,** made in England, with twelve cut-out jungle animals in it, is S9. (All of these are from the Field's toy department.) A 500-piece **puzzle** photograph of a magnificent bald eagle is S7 in the adult games section of Fields.

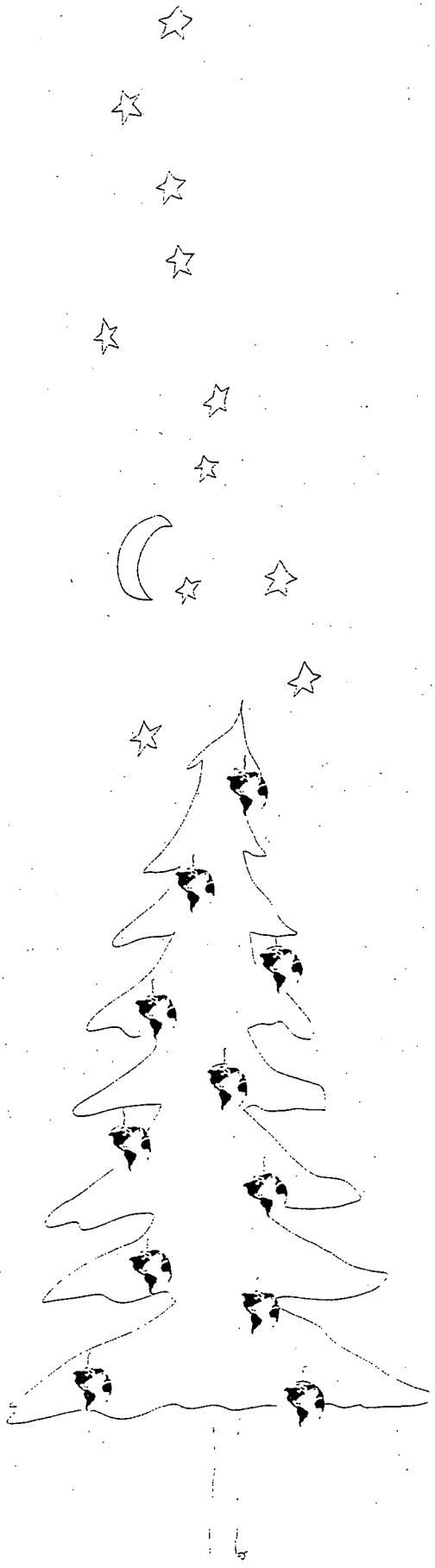
The most didactic toys tend to be the games. Our favorites are **"Hare and Tortoise,"** "the most ingenious race game ever designed," by Intellect Games of London, and **"Circulation,** an incredible journey." "Hare and Tortoise," we're told, is winnable only with strategy...and carrots. "In what other race does a tortoise stand a chance of beating a hare?" the manufacturers ask. It's S10 in the adult games section of Field's, and maybe it will teach us something about planned growth.

In "Circulation," those 10 and over are invited to "defy unexpected dangers at every turn as you complete your vital mission" — which is to survive the rigors faced daily by the average blood cell. The game is S12.95 at our local school supply store, and is available through Bloomingdale's in New York.

Less interesting, but closer to the subject, are: By Avalon Hill, **"Outdoor Survival,"** S9.95 for those nine and over; by Teaching Concepts, **"Endangered Species,"** S9.95 and an F.A.O. Schwarz exclusive; and, from the educational division at Milton Bradley, **"Climate and Land," "Using Natural Resources,"** and **"Conserving Natural Resources"** (S4.25 each).

And don't forget to help save the whales! A stuffed **patchwork whale,** made in West Virginia, 13 inches long, is S11 plus S.95 mailing charges from Whale Gifts, 2100 M Street, Washington, D.C. 20037. The proceeds from the sale of this whale, as well as a **wooden whale puzzle** (S5.50 plus S.85), a **marine mammal chart** (S3 plus S.65), or a child's **"Gentle Giant" t-shirt** (S4.95 plus S.75), all go to the Whale Protection Fund. They have gifts for adults, too.

All that's left is to remind you that the planet itself is an endless source of amusement, fun, and games, and that as such it is the ultimate environmental toy. It is free, all around you.



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National

13
This is the third anniversary of the day Karen Silkwood was killed on her way to meet a New York *Times* reporter, carrying papers that supported her allegation of safety hazards at the Kerr-McGee plutonium plant in Oklahoma. A Washington-based group, Supporters of Silkwood, is pressing for a criminal investigation of the case.

17—21
U.S. EPA will hold public hearings on the solid waste product charge November 17 in Washington, D.C., November 18 in Cincinnati, Ohio, and November 21 in Portland, Oregon.

22
The Public Broadcasting System will air a Jacques Cousteau special about diving in the Aegean tonight.

Wisconsin

7—11
Advance Plan Hearings continue for the eight major Wisconsin electric utilities before the Wisconsin Public Service Commission. Witnesses representing the four eastern utilities will be cross-examined.

14
Final hearings on *Illinois vs. Milwaukee* will be held, at which the judge will issue final orders determining how quickly and what kind of measures Milwaukee must take to clean up its sewage emissions into Lake Michigan.

16
There will be a monthly meeting of the Department of Natural Resources Board in Room 1305, Pyeare Square Building, 4610 University Avenue, Madison, at 9:30 a.m.

Indiana

12
There will be an Environmental Fair all day at Purdue University's Calumet Campus, including films, lectures, and workshops.

Illinois

7—10
Load Forecasting Hearings resume for the six major Illinois electric utilities. Illinois Commerce Commission witness Darrell Smith will be cross-examined.

14—16
Peak Load Pricing Hearings (on rate structure reform) resume for the six major Illinois utilities. Utility witnesses will be cross-examined.

18
U.S. EPA holds a workshop on jobs and environmental regulations with the United Steelworkers local 65 at 9350 South Chicago Avenue at 10 a.m.

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CHICAGO: Suite 2610,
59 E. Van Buren,
Chicago, Illinois 60605
312—939-1530
DE KALB: 323 East Lincoln Highway
DeKalb, Illinois 60115
815—758-1684
MILWAUKEE: Suite 502,
536 W. Wisconsin,
Milwaukee, Wisconsin 53203
414—271-7475
MADISON: 512 W. Wilson
Madison, Wisconsin 53703
608—251-2804

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Editor: Flora Johnson
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