

Please log & circulate; Jerry, Jack, Ind,  
Dick Boyss, Dr Wills. Thanks, Zory

OFFICE OF THE SECRETARY OF DEFENSE

RF/microwave - report

19084 1-2

18 Dec

Memo For Dr Zory Glaser

NIOSH

Park lawn Bldg Rm 8A-30

5600 Fishers Lane

Rockville, MD 20857

Dear Zory -

Attached is the article  
from the Environmental Reporter  
which I described. Hope you  
find it interesting. Give me  
a call if you have any info  
of interest.

Sincerely,

*Jerome R. Clifford*  
JEROME R. CLIFFORD

"The new Resource Conservation and Recovery Act program will be similarly jeopardized if the 46 vacancies for that program are not available."

Vacancies for enforcement staff for all the EPA programs are "equally important," the members said.

Abolishing the positions "may actually slow the permitting process for new industrial sources and, thus, contribute to inflation by restraining improved industrial productivity."

Signing the letter were Commerce Committee Chairman Harley O. Staggers (D-WVa), Health and the Environment Subcommittee Chairman Paul G. Rogers (D-Fla), Consumer Protection and Finance Subcommittee Chairman Bob Eckhardt (D-Texas), Oversight and Investigations Subcommittee Chairman John E. Moss (D-Calif), Henry A. Waxman (D-Calif), James J. Florio (D-NJ), John M. Murphy (D-NY), Toby Moffett (D-Conn), Charles J. Carney (D-Ohio), Richard L. Ottinger (D-NY), Andrew Maguire (D-NJ), Albert Gore, Jr. (D-Tenn), Barbara A. Mikulski (D-Md), James H. Scheuer (D-NY), and Timothy E. Wirth (D-Colo).

### Research

#### TRANSPORTATION RESEARCH BOARD REPORT INCLUDES PAPERS ON ENVIRONMENTAL TOPICS

A new Transportation Research Board publication includes research papers on transportation-related environmental concerns.

Taxes leading to higher gasoline prices "have considerable potential for reducing automotive fuel consumption," vehicle miles travelled, and vehicle sales, according to one research paper included in Transportation Research Record No. 648.

The paper says fuel economy standards "appear to have a significant beneficial effect on fuel consumption but relatively little effect on automobile sales and travel."

The paper recommends revising existing fuel economy standards and penalties for noncompliance.

Another research paper on energy conservation through public transit use says "short-term fuel savings attainable from shifts to transit" are small, ranging from one to four percent.

A Wisconsin survey shows that gasoline prices would have to rise to more than 80 cents per gallon to significantly affect travel patterns, according to another paper.

Other papers included in the record concern preferred fuel conservation methods, traffic noise prediction, bus lanes, and use of traffic simulation to analyze carbon monoxide pollution.

Transportation Research Record No. 648 is available for \$4.80 from the Transportation Research Board, Publications Department 805, 2101 Constitution Ave., N.W., Washington, D.C. 20418.

### Energy

#### REFUSE-FIRED POWER PLANT PLANNED TO SOLVE COLUMBUS LANDFILL PROBLEM

Electricity for Columbus, Ohio, is expected to come from a refuse-fired power plant by early 1982, according to Turbodyne Corporation of Minneapolis, maker of the three 30-megawatt steam turbine generators for the plant.

Not only would the plant replace an old facility Ohio which did not comply with pollution control standards, but it also

would solve Columbus's landfill problem, according to the Columbus Division of Electricity.

City officials said that when Columbus filled its landfill site within the city limits and the Ohio Environmental Protection Agency disapproved proposed new sites, the city had to contract to have its refuse disposed of at a site in nearby Franklin County.

The new plant, expected to cost \$118 million, is thought by city officials to be the largest refuse-fired municipal plant in the U.S. It is to be fed by three existing satellite shredder facilities which would sort and pulverize an estimated 1,096 tons of refuse per day from about 900,000 people in Columbus and Franklin County.

Turbodyne says Columbus refuse would comprise about 80 percent and coal 20 percent of the fuel for the steam generators.

Coal would serve to stabilize uneven burning of the refuse and would be available for emergency use if refuse is not available, according to Turbodyne.

The heat value of refuse is estimated to be 4,500 Btus per pound, compared to 12,500 Btus per pound for coal, according to the Columbus Division of Electricity.

The plant would be permitted to dispose of ash residue on the adjacent 60-acre landfill site at least until the year 2000, according to the division.

The city estimates that revenues from the sale of electricity from the plant would pay for operating costs, provide electricity for street lights in Columbus, and pay for new street lights.

A 1975 feasibility study for the project had estimated that refuse quantities would increase with population and with the demand for electricity, city officials said.

### Radiation

#### EPA CONSIDERS CHRONIC EXPOSURE TO LOW-LEVEL MICROWAVE RADIATION

RESEARCH TRIANGLE PARK, N.C. — (By an Environment Reporter staff correspondent) — Recent tests indicate that chronic, low-level exposure to microwave radiation may have a biological effect, according to an Environmental Protection Agency scientist.

Dr. Daniel F. Cahill, director of the Experimental Biology Division in the Health Effects Research Laboratory (HERL), said Soviet and Eastern European scientists long have contended that chronic, low levels of microwave exposure affect behavior and the central nervous system.

Until a few years ago, however, American scientists concentrated on "thermal" effects of microwave, or nonionizing, radiation through studies of acute, high-level exposure.

"The dogma was that if you couldn't produce anything with an acute slug, then there was no problem at chronic low levels," Cahill said.

"What the Soviets were saying to us was that our experience and all our data for ionizing radiation (x-ray) doesn't apply to this problem," he said.

#### Collaborating With USSR

In December 1976, the U.S. and the Soviet Union agreed to collaborate on research on effects of nonionizing radiation on behavior and the central nervous system.

In addition to EPA, U.S. agencies participating are the National Institute of Environmental Health Sciences (NIEHS) in Research Triangle Park, the Bureau of Radiological Health in the Food and Drug Administration, the University of California-Los Angeles, and the University of Washington.

add  
Glansy

from the "Environment Reporter"

"When we at EPA changed our way of doing things to take a look at how the Soviets do theirs, we began to see things — that they appeared to be more correct than we had given them credit for," Cahill said.

"Chronic, lower level exposures do seem to have an effect in biological systems," he added.

The difference in the approaches to the health effects of microwave radiation resulted because the Soviets have been researching microwaves longer, Cahill said.

"They were sufficiently advanced that they had passed through the acute, high-level exposure studies which you usually start with and had gotten into the chronic, low-level exposure over a number of months," he explained.

"What's happened is that we too in the past three years have passed through that stage where all the experimentation done was acute, high-level."

#### Millions Are Exposed

Americans are exposed to microwave radiation both in the home and the workplace. Cahill estimated that several million people are exposed to microwaves occupationally.

Microwaves are found in electronic products ranging from microwave ovens and diathermy machines to industrial cooking and drying ovens.

Cahill said people can be exposed to microwave radiation through FM radio, UHF and VHF television, citizen's band radio, and, to a lesser extent, airport radar.

In industry, microwave radiation is used for such varied purposes as drying glue used to bond plywood, and drying potato chips during production.

Cahill's division has \$930,000 for microwave research during the next fiscal year.

His group, which he terms "the largest intramural microwave health effects program in the federal establishment," is studying teratology, immunology, hematology, and behavior.

In addition, his division is responsible for the engineering associated with microwave testing in exposure chambers and for dosimetry.

"In our experiments, we like to use an interdisciplinary approach," he said. "Microwave health effects research is extremely complicated." Electrical engineers, physicists, and biologists are needed, he said.

The Experimental Biology Division has used rats, mice, and Chinese hamsters in in-house studies and monkeys in an extramural study.

#### Exposed From Conception

The animal is exposed to microwave radiation from the day of conception until it is sexually mature, a period of almost four months.

"The things that we look for are birth defects," Cahill said. "We look to see if there's any effect on their growth, whether their reflexes are developing properly. As they get older, we'll check their immune defense system and perform different behavioral tests."

In addition, he said, "when they're sexually mature, we'll mate them to see if there has been any genetic damage in them that will be transmitted to a subsequent generation."

Although low-level, chronic effects of microwave exposure are still under study, high-level effects have been documented. "The two organs that are susceptible to high power density exposures are the eyes and the gonads, particularly the testes because they're outside the body cavity and can't take much heat," Cahill said.

The thermal, or heating, effect of high levels of microwaves can cause cataracts in the eyes and sterility in the male, he said.

#### Adopted Guideline

The American National Standards Institute in 1966 developed a radiation guideline of 10 milliwatts per square centimeter which was adopted by the Occupational Safety and Health Administration.

"To the best of my knowledge, no humans exposed in the workplace at that level for eight hours a day for any length of time have come up with any ill effects that have been directly attributed to the exposure," Cahill said.

He added, however, "There's a considerable body of experimental animal data that's beginning to show that exposure to those power densities for long periods of time in fact can have some significant effects."

He listed such effects as changes in behavior of rats and impact on the immune system.

"There's a reevaluation of the guideline going on right now," Cahill said. "The implications are it will probably be lowered" after it is reevaluated next summer, he said.

Despite that, the American standard would still probably be higher than that adopted by the Soviet Union and Eastern European countries where the exposure standards are one thousand times lower than the present U.S. guideline.

#### Research

#### LONG-TERM SULFUR DIOXIDE EXPOSURE AFFECTS PLANTS, ANIMALS, EPA SAYS

Long-term, low-level sulfur dioxide exposure can cause "insidious changes" in plants and animals near coal-fired power plants, according to the Environmental Protection Agency's Corvallis Environmental Research Laboratory.

The laboratory is studying effects of sulfur dioxide pollution on plants and animals near Montana's Colstrip coal-fired power plant project (Current Developments, June 16, 1978). The laboratory says sulfur dioxide pollution "could produce substantial changes in the ecosystem" over an extended period of time.

Since 1974, "key characteristics of the ecosystem" have been monitored at the Colstrip site "to detect possible pollution impacts" on wildlife, according to the laboratory.

Monitoring detected no effects on wildlife during the first season of exposure to sulfur dioxide, however, substantial effects were noted during the second season, the laboratory says.

It says results of its study at the Colstrip site "could have dramatic implications for long-term productivity of grazing land throughout the Northern Plains."

According to the laboratory, chronic and low-level sulfur dioxide pollution can:

- ▶ Decrease protein content and digestibility of western wheatgrass;
- ▶ Change grass species metabolism, growth, and reproduction;
- ▶ Wipe out soil-stabilizing lichen populations;
- ▶ Reduce beetle populations important to decomposition; and
- ▶ Lower soil organism activity.

The Colstrip research project includes plans to devise "a methodology for incorporating ecological effects information into the power plant siting process," the laboratory says.

Interim reports on the research project, "The Bioenvironmental Impact of a Coal-Fired Power Plant," are available from the National Technical Information Service, 5285 Port Royal Rd., Springfield, Va. 22161; first interim