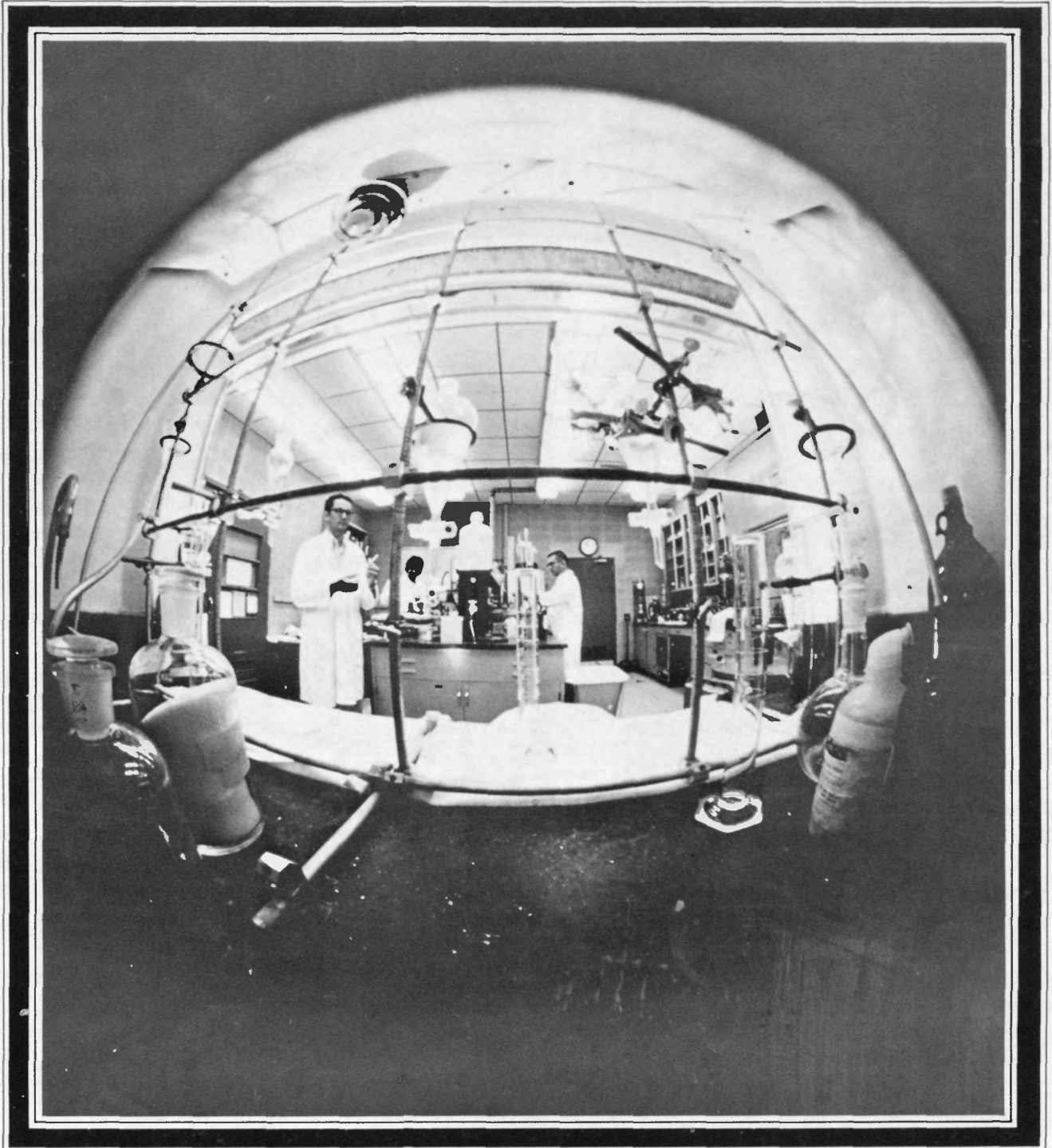


# EPA JOURNAL

OCTOBER 1975

VOL. ONE, NO. NINE



THE RESEARCH MISSION  
ENVIRONMENTAL HEALTH



U.S. ENVIRONMENTAL PROTECTION AGENCY



## THE SEARCH

The pollutants we don't know much about could be the most dangerous of all. Hidden in the shadows, they may be the patient assassins whose lethal effect will not become apparent for many years.

One of the objectives of EPA's research program is to shine a spotlight on these pollutants which may be causing cancer and heart disease.

The role of EPA's researchers in ferreting out these menaces to human life is discussed in an interview with Dr. Roy Albert, Acting Deputy Assistant Administrator for Health and Ecological Effects.

This work is part of the over-all effort by the Agency's 1,800-member scientific staff which is seeking the answers to the complex problems of pollution.

While EPA is first and foremost a regulatory Agency which must establish and enforce standards, these standards cannot be set and enforced without an effective scientific research and monitoring program.

If pollution cannot be detected, identified and measured, it obviously cannot be controlled.

An over-all view of EPA's diversified research programs is presented in an article by Dr. Wilson K. Talley, Assistant Administrator for Research and Development.

One of the major research projects being conducted by EPA is the most comprehensive air pollution study ever undertaken. An article in the

Journal explains that the study, though limited to the St. Louis area, is expected to provide valuable information on how to deal with metropolitan air pollution problems generally.

Another article reports that what is probably the largest water sampling field program ever launched by EPA is drawing to a close. It is the National Eutrophication Survey which has been checking on the health of 800 of the country's lakes and tributaries.

From Boston, the Journal has a story about the testing of ultraviolet light and ozone gas to purify drinking water in some Vermont communities. One reason for the project is that many of the ruggedly independent Vermonters feel that they have the best tasting water in New England and oppose chlorination on grounds of taste and odor.

Was EPA right or wrong in its findings when the Agency banned the use of DDT in 1972 for almost all domestic uses? An article in the Journal summarizes a bulky report which in general supports the 1972 findings and states that new research has not invalidated the ban.

Other items in this issue include:

An article on what EPA research is doing to help industry reduce water pollution.

A report from our laboratory at Ada, Okla., discussing the use of clams, fish, sunlight and soil, and bullrushes and cattails to help cleanse waste water. □

# EPA JOURNAL



**UNITED STATES  
ENVIRONMENTAL  
PROTECTION  
AGENCY**

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Cover: EPA scientists conducting laboratory research work.

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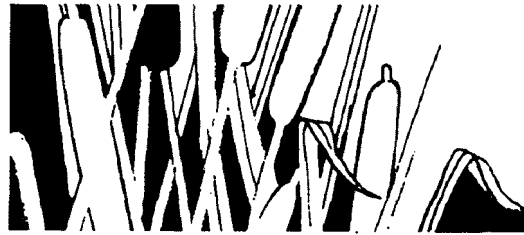
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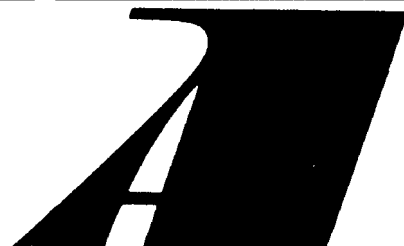
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# THE RESEARCH MISSION

By Dr. Wilson K. Talley

**T**he fundamental mission of the Environmental Protection Agency isn't hard to state: the achievement and enhancement of a quality environment. Our research contributes to the development of effective pollution control strategies and in the promulgation of reasonable and scientifically sound environmental standards and regulations.

Some of the basic questions confronting EPA's research program include:

When does a substance in the environment become a "pollutant"?

To what extent should a pollutant be controlled?

What is the best way to eliminate or control the pollutant?

EPA's Office of Research and Development needs the answers to provide timely and valid scientific information and necessary technical tools and control systems.

Phosphates provide a simple illustration of some of the basic questions we are concerned with. As we all know, phosphates are a widely used fertilizer and can play a useful role for man.

However, excess phosphate in our waterways can cause degradation of water quality and lead to fish kills. These results occur because too much phosphate stimulates massive growths of algae and other aquatic vegetation which later die and absorb the oxygen in the water.

So we have the responsibility of determining how much phosphate a lake can tolerate before it suffers from excess algae. Then we have to decide what techniques can be used to deal with this problem most effectively.

These are the types of problems we have been dealing with in the case of Lake Shagawa in northern Minnesota, for example. We have been successful in restoring this badly polluted body of water by drastically reducing the amount of phosphates discharged in wastewater from an advanced waste treatment plant.

## SEVEN ACTS

Our research program is authorized by seven separate congressional acts: The Clean Air Act; the Federal Water Pollu-

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*Dr. Wilson K. Talley is Assistant Administrator for Research and Development.*

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tion Control Act; the recently passed Safe Drinking Water Act; the Solid Waste Disposal Act; the Federal, Insecticide, Fungicide, and Rodenticide Act; the Public Health Service Act; and the Noise Control Act.

Through this legislation, we have available \$250 million for research this fiscal year. Of this total, \$66 million will support the in-house activities of our staff of 1800 professional and support workers in 15 field units and headquarters. The remainder of the money will support an outside research program—fully integrated with the in-house research—that is carried out through grants and contracts with the academic, research, and industrial communities, as well as through cooperative agreements with other Federal, State, and local agencies.

The ties between the in-house researchers and the EPA-financed external programs are and must be close. The research program exists to support the regulatory role of the Agency, and hence either the researcher or, if the research is extramural, the research manager, has to be available to assist the Agency in developing appropriate regulations and standards, to provide expert advice to policy makers, to provide continuity and direction to the research, and to testify, if necessary, at enforcement actions.

Because of the manner in which the Agency receives its authorizing legislation, the research program for budgetary purposes has been classified along specific media or categorical lines such as air, water, pesticides . . . But pollu-

tion problems seldom restrict themselves to such arbitrary boundaries — pollutants often create spillover effects in other media. And other factors — costs, for instance, and feasibility of alternative strategies — preclude focusing solutions in only one medium. Consequently, environmental research must be integrated.

## FIVE-YEAR PLAN

This integration must fit a time frame suited to the schedule of problems and responsibilities we face. So in working out a new structure for the research program, we have shifted our planning from a year-to-year schedule to a 5-year time frame. Each year, we will spell out what we can foresee for the next five—and thus revise this 5-year plan each year. ORD's new organizational structure follows accordingly, and is organized by type of product.

ORD's short-term activities, primarily quality assurance, monitoring, and analytic responses to the immediate needs of other Agency programs, were grouped together under the Office of Monitoring and Technical Support.

The relatively more stable long-term activities, relating to the determination of the human health and ecological effects of pollutants, were organized into the Office of Health and Ecological Effects.

The third component of ORD's mission—meeting legislative and Agency mandates for control or abatement technology — was, because of its size, organized into two groups: The Office of Energy, Minerals, and Indus-

try; and the Office of Air, Land, and Water Use. Our main programs are organized within this framework.

These four offices plan and implement research that can be broken into our 14 major program areas.

**H**ealth effects is a base research program, where our scientists work to determine and evaluate health hazards that may arise from pollution from a number of media and categories including air, water, pesticides and radiation. In taking environmental action to protect human health, we regulate exposure to specific contaminants, not their effects. In this way, adverse health effects associated with pollution may be reduced or eliminated rather than treated after the fact.

In developing the data needed to establish exposure/response relationships, we examine how pollutants reach man: i.e. via air, water, food or a variety of routes. In addition to laboratory studies, one of the ways we investigate exposure/response relationships is through observing the health of different population groups.

For example, we are assessing the incidence of illness in swimmers at relatively clean and relatively polluted beaches to determine better how the illness can be correlated to chemical or microbial indicators of water quality. The information obtained will be used to help us develop health criteria for recreational water quality.

Similarly, we are carrying out studies to assist in evaluating existing standards and developing new ones for air quality. Conducted in several locations across the country, these studies are designed to investigate the relationship between air quality and health effects such as respiratory disorders in children, asthmatics, and other population subgroups.

**E**cological effects and processes is a research program which determines the effects of air and water pollutants on the structure and function of ecosystems and on subcomponents of such systems. Work is planned and organized along problem area lines; it is directed toward target media — freshwater, marine, and terrestrial — and conducted according to the character of the problem.

Among the studies in progress are those to define and characterize ecosystems; that is, to unravel the myriads of individual ecosystem components and then to understand their dynamic, functional relationships.

To do this, we carry out field studies on natural ecosystems as well as attempt to simulate ecosystems in the laboratory. With the knowledge gained, we can enhance our capability for accurately determining the impact of existing pollution on the ecological balance and for predicting the damage of increasing pollution.

For example, we are studying the effects of pollutants from a new coal-fired power plant on the wildlife and on the surrounding grasslands in Colstrip, Montana.

We must answer questions such as: what effect will pollutant X have on the plant or animal organisms in an ecosystem? Will the pollutant impair the organism's ability to reproduce or escape predation? How will the ecosystem be functionally altered if pollution renders a species of plant or animal incapable of surviving?

**T**ransport and fate of pollutants research produces empirical and analytical techniques to allow relating air and water pollution emissions to ambient exposures. In the atmosphere, we must identify sources, sinks, and transport and transformation processes for gases and particulates. In aquatic environments similar considerations apply. This area also includes effects on visibility, turbidity, rainfall, water quality, and intermedia transfer of pollutants.

To discover feasible control and abatement technology, several programs address various aspects of this complex work.

**W**aste management program research focuses on the prevention, control, treatment, and management of pollution resulting from community, residential or other non-industrial activities. This area includes municipal and domestic wastewater, collection/transport systems, land surface runoff, municipal solid wastes and air pollutants. Current research includes the development of improved methods for the processing and disposal of sewage sludge. We are also looking at the possibilities of incinerating the sludge in combination with solid waste and attempting to make use of heat generated in this process.

**W**ater supply activities include research, development, and demonstration necessary to provide a dependable and safe supply of drinking

water, and to prevent health damage resulting directly or indirectly from contaminants in drinking water.

For example, new and improved technology is being developed for the removal of infectious agents in drinking water. The problem with using chlorine as a disinfectant is that it produces substances which may be toxic, so we are exploring alternatives to chlorination. These alternatives include the use of ozone and the use of ultraviolet light.

We are also looking at technology for the removal of potentially toxic organic contaminants from drinking waters. One such technique for removal of these organics involves the use of activated carbon. Added to the water in powder or granular form, the carbon acts as a sort of sponge — the organic compounds attach themselves to the carbon which is then removed.

**M**ineral extraction processing and manufacturing program research is concerned with point sources of air, water, and residues pollution that may arise from the industrial sector of the economy. It is focused on those mining, manufacturing, service, and trade industries which are involved in the extraction, production, and processing of non-energy materials into consumer products. In addition, the environmental problems that can arise from accidental material spills are studied. This research activity supports the technical requirements of the Clean Air Act and Water Pollution Control Act by developing and demonstrating new or improved, cost-effective abatement technology.

**R**enewable resources program activities encompass the development of total management systems, including predictive methodology, that are to control air, water, and land pollution resulting from the production and harvesting of food and fiber. This area includes the assessment of probable trends in the production of renewable resources and their resulting environmental impact. Major areas of concern include crop production in both irrigated and nonirrigated lands, forestry practices, and animal production.

**E**nvironmental management research looks at environmental management strategies—various

CONTINUED ON PAGE 19

# ENVIRONMENTAL HEALTH PROBLEMS REVIEWED

INTERVIEW: DR. ROY ALBERT,  
ACTING DEPUTY ASSISTANT ADMINISTRATOR  
FOR HEALTH AND ECOLOGICAL EFFECTS,  
OFFICE OF RESEARCH AND DEVELOPMENT

QUESTION: Which type of environmental pollution do you consider the most dangerous?

DR. ALBERT: I would guess those that we don't know about yet. This may seem like a facetious answer, but I think it probably is true. For example, although there is evi-

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## Are environmental health problems growing?

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dence that a substantial amount of cancer is due to chemical and physical agents in the environment, the actual definition of which of these is causing cancer is really not clear. There needs to be much more effort in determining which materials are causing what forms of cancer.

In the area of heart disease, recent evidence has shown that arteriosclerosis may be a benign form of tumor of the walls of the major vessels, and that these lesions themselves may be influenced by environmental agents as well as by dietary patterns.

These two diseases account for the bulk of our death rate. Finding the environmental factors and agents that influence these diseases will be a major contribution to the control of the country's public health problems.

QUESTION: Is the environmental health problem growing or receding, in your judgment?

DR. ALBERT: I think that it is growing in the sense that we are coming to appreciate more and more the importance of environmental factors in the causation of disease.

This is not to say that genetic factors

cannot make a person more susceptible to disease. We know they can. Or that biological agents are not important, because we know they are. But it is becoming more and more apparent that the interaction of chemical agents in the environment with these other factors is essential to the production of diseases.

QUESTION: Which major industries have the most dangerous emissions for their workers and the surrounding populations?

DR. ALBERT: I think this is a question which I find difficult to answer. My guess is the chemical industry.

There is a tremendous range in the competence and attention paid by the chemical industry to the control of hazardous materials.

This is a particular problem with the smaller chemical companies. And in fact, we have a situation that emerged recently in Hopewell, Virginia, which calls itself the chemical heart of the South. A company manufacturing Kepone, an ingredient for an ant and roach bait, has run into trouble. Some of its employees were poisoned.

When I heard about this, I thought the EPA ought to certainly be involved promptly in terms of contributing to

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## Is EPA going to have a coordinator for all cancer matters?

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the assessment of the degree of environmental pollution. We had a small group of scientists go from the Health Effects Research Laboratory in Research Triangle Park, N.C., to Hopewell to help evaluate the mag-

nitude of the environmental contamination, and to see what they could do in terms of assisting the local health people and the regional EPA office in the control of this problem. We also wanted to see what could be learned from a research standpoint which would help us in similar problems in the future.

QUESTION: Does EPA need to do a better job in monitoring these industries?

DR. ALBERT: I think that there is no question about that, and this needs to be done in a variety of ways. An important one, of course, would be the passage of the Toxic Substances Act so that agents which have an unwarranted degree of toxicity with respect to their usefulness can be handled appropriately. And I think that probably more attention should be paid to the level of environmental contamination from industrial production facilities.

QUESTION: A news magazine said in a recent issue that, "Physicians smiled in disbelief when cancer researcher Dr. John Higgenson of the World Health Organization suggested that as many as 80 percent of all can-

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## Does EPA need to do a better job in monitoring industries?

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cers were caused by agents in the environment, but no one is scoffing any more."

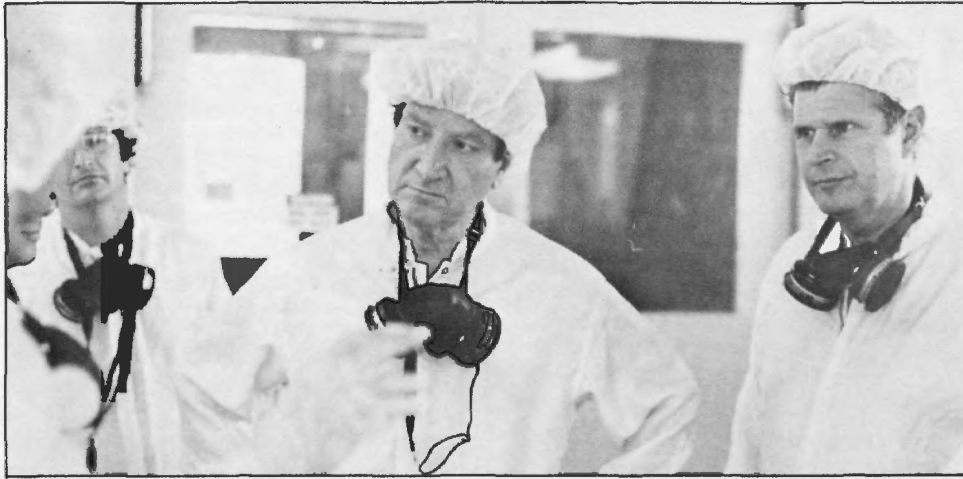
Can you comment on this?

DR. ALBERT: Well, I think that it is a characteristic of scientists to smile in disbelief when they hear something new, and this is right and proper.

My own experience is if you have something really worthwhile to say, that nobody will believe you; and if you have nothing to say, nobody will listen to you.

But in this particular instance, I think that there is a pretty solid reason for the point that Higgenson was making, and others have made it too. Essentially the point is that if you look at the cancer occurrence in different parts of the world, you find that in some areas certain cancers are very common, and other cancers are rare. In other parts of the world, you find that the cancers which are rare in other places are common there.

And also, you find that when you look at people who migrate from one country to another, for example, into this country, the cancer experience of



Wearing protective clothing and with masks and goggles ready, Administrator Russell E. Train and Dr. Roy Albert, Acting Deputy Administrator for Health and Ecological Effects, Office of Research and Development, are briefed before a tour of the Frederick Cancer Center, Fort Detrick, Md., where experimental animals are tested with pesticides and other chemicals suspected of causing cancer.

their first and second generation descendants, and even amongst the original immigrants, changes in such a way as to take on the characteristics of the people in this country.

For example, in Japan the incidence of stomach cancer is extremely high, and the incidence of intestinal cancer

### Why do certain types of cancer occur more in one section of the country than another?

is very low. When one looks at persons who have migrated to this country from Japan, the stomach cancer experience shows a substantial drop.

This has been shown also from immigrants from Europe. For example, in Germany the incidence of stomach cancer is very high, and in this country it is considerably lower.

So this is the sort of evidence that is behind the assessment that environmental factors are the major contributors to the cancer experience.

**QUESTION:** Is EPA going to set up a new position of coordinator for all cancer matters the Agency has to deal with?

**DR. ALBERT:** Yes, it is. And I am the one who has been designated.

The issue at the moment is the formulation of a policy on carcinogens by the EPA, and this is under vigorous discussion. It is a complicated matter because from one standpoint, it would be nice to be able to ban all agents which are carcinogenic, as in the case of the Delaney amendment which pro-

hibits any food additives that cause cancer in laboratory animals.

But the realities of life are such that this is an impractical thing because there are agents which show carcinogenic activity which can't be eliminated from the environment in any feasible sense, because these agents are essentially irreplaceable.

So the problem is to control them to minimize the risk of cancer, and yet permit their use in a fashion which is not economically prohibitive. So this calls for a maximum intensity of effort to define the relationship between exposure level and risk, to weigh this aspect with the socio-economic impacts of various degrees of control, and then form a rational judgment of the best balance of the positive and negative aspects of the use of such materials.

**QUESTION:** Is EPA engaged in any studies now on why certain types of cancer occur more frequently in one section of the country than others?

**DR. ALBERT:** Yes. There is a growing amount of research in this area. One of the recent findings that has stimulated this type of work has been the higher cancer incidence in New Orleans and other cities along the Mississippi River in relation to the possibility that the chlorinated organic materials in the drinking water may be responsible.

The EPA has done a large survey involving 80 cities to characterize the amount of chlorinated organic materials in drinking water, and indeed, there is a substantial amount of it. Some of it occurs by the interaction of chlorine with naturally present organic material. Some of it is due to industrial discharges. And there is a very active program to define the importance of

these materials in terms of the health effects and to develop and utilize methods of controlling the levels of these agents in the drinking water.

**QUESTION:** Has EPA reached any conclusions about the possible health impact of asbestos fibers found in the drinking water in Duluth, Minnesota?

**DR. ALBERT:** No. This issue is still up in the air. There are animal studies that are being launched, and there are epidemiologic studies which are going on to try to answer the question. But this data hasn't matured sufficiently to give any definitive answers.

**QUESTION:** A news magazine said in a recent article that Dr. Barry Commoner has developed a test that can quickly identify chemical compounds which are carcinogenic. Is this true?

**DR. ALBERT:** This article referred to the use of bacteria as test indicators of mutagenic activity. The story goes back to the growing body of evidence that agents which are capable of inducing mutations, that is, hereditary changes in cells, are frequently carcinogenic agents.

### Which type of environmental pollution is the most dangerous?

It is a long drawn out procedure to test agents for their carcinogenic activity in animals, and a very serious attempt is being made to find quicker test methods, because the animal studies require several years to complete and are very expensive.

So the high degree of correlation between mutagenicity and carcinogenicity has been used as the basis of a kind of test that Commoner is doing. And this approach has a rather long history.

The difficulty with bacterial systems is that bacteria can have a different range of susceptibility than humans, and for that matter the same problem holds for testing of carcinogens in animals.

The second difficulty with bacterial systems is that some carcinogens, in fact, many carcinogens, have to be converted by the natural metabolic processing into the active form. This, of course, is something which bacteria can't do.

Bruce Ames, of the University of California, has developed an inge-

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# ST. LOUIS STUDY YIELDING AIR DATA

St. Louis, Mo., sits at the junction of two great rivers, the Mississippi and the Missouri. They have shaped the city's history and they affect the lives of two and a half million people within a 25-mile radius of the Gateway Arch.

But a third river at St. Louis is now under intensive study by EPA. It is the river of air that flows over the St. Louis metropolitan area, picking up pollutants from autos and factory smokestacks and spreading them out over the area. This river has no banks, and its flow is sometimes smooth, sometimes turbulent. It can move swiftly to carry away pollutants emitted in the St. Louis region. Occasionally it can come to a near standstill, permitting pollutants to thicken and become more hazardous.

Understanding and describing the river of air over a metropolitan area is the objective of EPA's Regional Air Pollution Study (RAPS, for short), a \$22-million, five-year research program now in its fourth year.

The most comprehensive air pollution study ever undertaken, RAPS seeks to learn how pollutants move and change under various weather conditions, what makes them concentrate or disperse, and thereby establish a basis for control measures.

In effect, RAPS makes the St. Louis area a gigantic test tube for both the scientific study of air pollution and the demonstration of ways to treat the problem, according to Dr. Francis Pooler, who heads the RAPS Coordination Office of the Environmental Sciences Research Laboratory in North Carolina. There is close contact and interchange between the RAPS field investigations and the Laboratory, headed by Dr. A. P. Altshuller.

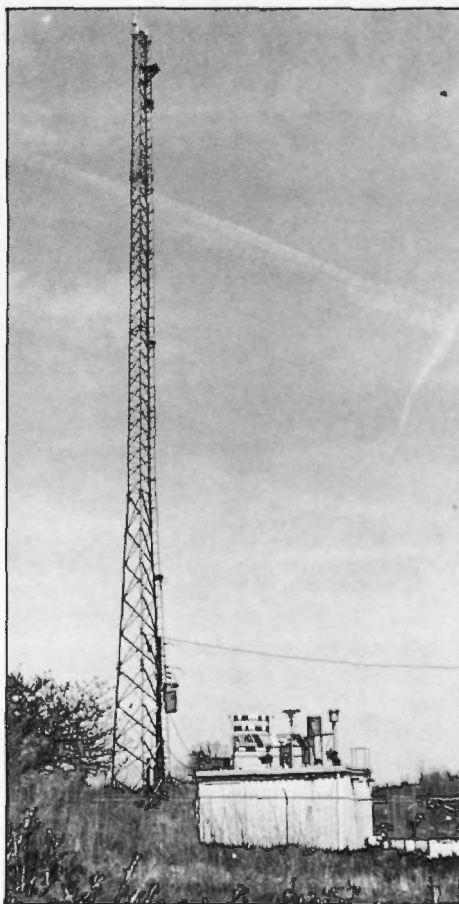
Most of the field work at St. Louis is being done by Rockwell International Corp., of Thousand Oaks, Calif., as prime contractor. There are several subcontractors for specific parts of the study, and numerous special studies are performed by grantees and other Federal agencies, under the guidance of EPA scientists. The pollution control agencies of Missouri and Illinois and various local governments are cooperating because of their interest in the study's results.

Gene D. Prantner is EPA's field director for the project, stationed in the St.

Louis suburb of Creve Coeur with a staff of three: James Reagan, facilities manager; Frank Schiermeier, operations coordinator; and Stanley Kopczynski, physical scientist.

The RAPS project has spawned dozens of scientific papers already, but they have been concerned with small portions of the over-all effort, for instance, the behavior of pollution "plumes" from factory stacks, the size and composition of aerosols (tiny particles suspended in air), improved methods of measuring local weather conditions, and ways of detecting pollution from a distance.

The real payoff in the complex study is expected to start next year, when the elaborate, automated system for collecting and analyzing data will have been in full operation for more than 16 months. The central computer system was set up by Rockwell International scientists just a year ago. Feeding into it are 25 monitoring stations scattered throughout the Greater St. Louis area. Each sta-



Air sampling station near St. Louis with a 100-foot tower and monitoring equipment.

tion has automatic equipment to record meteorological data like wind direction and speed, temperature, humidity, and a wide variety of pollution measurements. All these go directly to the computer, and also to the RAPS data bank in North Carolina, which is headed by Robert H. Browning.

Additional monitoring stations, operated by local agencies, and a fleet of mobile stations also contribute data. Power plant and factory stacks are monitored for pollutant emissions, and records are kept of fuel consumption and plant process schedules.

Two or three times a year EPA helicopters from Las Vegas, Nev., sample the air at various heights over each of the 25 RAPS monitoring stations to provide researchers with a picture of the air mass at various heights. Typically, a helicopter will start its air sampling 3,000 feet above the station, and then descend to about 300 feet, taking periodic samples. The pilot flies in a spiral to avoid having the down-draft from the copter's rotor interfere with the sampling.

In July the EPA helicopters logged 216 hours of air sampling, Mr. Prantner said, working two at a time, with a third craft in reserve. Aircraft operated by contractors and grantees also take part in these intensive study periods.

Other techniques for getting a vertical profile of pollutants and weather are also employed. These include radiosonde balloons, many-spectrum photography, and "lidar" instruments. (Lidar is a radar-like device that uses a light beam instead of a radio beam to detect an obstacle, in this case the air layer where pollution particles accumulate.)

The RAPS program has been carefully designed not only to collect vast amounts of data but also to analyze and correlate the information in many different ways, using computer methods for fast calculation and automatic print-out.

"RAPS is giving us information about real pollution in real air over a real city," Mr. Prantner pointed out. "It goes a step farther than any laboratory study, although the wealth of data and variety of conditions approach those obtainable in a laboratory.

"We expect to learn what pollutants exist over each area, where they move, and what chemical changes occur as they mix and are exposed to sunlight. We will learn how different winds disperse them, how rain washes them to the ground."

By analyzing measurements as they change with time and weather conditions, EPA scientists hope to accomplish two things:



# NATIONAL LAKE SAMPLING NEARS COMPLETION

One of the largest water sampling programs ever undertaken by EPA, the \$12-million National Eutrophication Survey to check on the health of more than 800 of the country's lakes and their tributaries, is drawing to a close.

Sampling activities will end in December and analysis of the thousands of analyses will be completed in December of 1976. The survey began in March, 1972, because of concern about the damage being done by nutrients in speeding up the aging of lakes.

In its normal life cycle a lake eventually is filled up with dead vegetation and debris, becoming a swamp or a bog. This process usually takes hundreds of years.

However, the discharge of large amounts of phosphorus and other nutrients in the wastes from sewage treatment and industrial plants has accelerated the lake aging process, formally known as eutrophication. Water drainage from farm fields which have been fertilized also contribute to this condition.

The nutrients stimulate the excessive growth of algae and other aquatic plants. When these plants die the decaying process uses up the water's dissolved oxygen, killing fish and causing foul odors and stagnation.

The National Eutrophication Survey is presently coordinated by EPA's office of Health and Ecological Effects and

carried out jointly by the EPA Environmental Research Laboratories in Corvallis, Oregon, and Las Vegas, Nevada, with the cooperation of the Department of Defense.

To conduct the sampling, EPA used helicopters loaned to the Agency by the U.S. Army. The helicopter sampling crews normally included a pilot, a scientist and a technician. When the helicopter landed on a lake electric sensor instruments were lowered into the water to check such indicators as temperature, turbidity and dissolved oxygen. Water samples were also taken from various depths.

After this work was completed, the helicopter moved on to a new site on the same lake or flew to another body of water.

In addition to this sampling work by EPA, approximately 5,000 National Guardsmen have cooperated with EPA by sending in monthly water samples from the tributary rivers and streams flowing into these lakes. The operators of sewage treatment facilities discharging into the lakes surveyed have also given EPA samples of the treated waste outflow from their plants.

All of this data is being analyzed and studied at EPA's laboratories in Corvallis and Las Vegas. The studies will provide information regarding the quantity and source of nutrients present in the lakes, the amount feeding into the lake from tributaries or other sources and

data on what happens to these nutrients as they travel through the water system.

This information will be correlated with geographical and climatological factors and information from land use and other studies.

The key officials involved in the survey are Kevin T. Mullen, National Eutrophication Survey Coordinator, Washington, D.C.; Victor W. Lambou, Environmental Research Laboratory, Las Vegas; Dr. Jack H. Gakstatter, Environmental Research Laboratory, Corvallis; and Lt. Col. Louis R. Dworshak, Secretary of Defense liaison officer.

Individual reports on the conditions in more than 100 of the lakes sampled have already been issued and reports on more than 400 other lakes are now being completed.

The overall report at the end of 1976 is expected to include conclusions on such subjects as improving treatment of municipal and industrial waste discharges, control of phosphates in detergents and tightening land use practices in tributary drainage areas. □

## ST. LOUIS STUDY

CONTINUED FROM PAGE 6

- Create more accurate "models," or mathematical formulas, that simulate all aspects of urban air pollution so what is likely to happen can be predicted reliably, and
- Test the effectiveness and associated costs of different methods of controlling pollution.

Dr. John N. Goulias of the Missouri Department of Natural Resources recently said: "We believe the potential cost benefits to be derived nationwide from RAPS to be in the billion dollar category."

St. Louis was chosen as the site of the RAPS project because it is a typical large metropolitan area with typical air pollution problems. It has a mixture of pollution sources, both automotive and industrial, and is reasonably isolated from other major pollution sources. There are no nearby oceans, large lakes, or mountains, all of which can affect pollutant production and dispersal.

The RAPS project is also an integral part of the interchange between the United States and the Soviet Union on environmental technology and pollution control. Leningrad is the matching city in the Soviet Union for regional air pollution studies. Technical experts from each nation have been exchanging visits and sharing information with each other, so that what is learned at St. Louis will augment what is learned in Leningrad, and vice versa. □



An EPA helicopter preparing to land on Lake Mead in Nevada to sample the water as part of national lake study.

# EPA RESEARCH HELPS INDUSTRIES

**W**hat do these things have in common: peeling peaches, quenching hot coke, "pickling" steel, and bleaching wood pulp?

If you guessed these operations use—and pollute—a lot of water, you would be right.

But few people know that EPA research has been a leading factor in showing American industries how to cut down the water pollution for such processes. Not only have pollutants been reduced, but in most instances the industries find they can save money by:

- Revamping their processes to require less water,
- Recycling and reusing water wherever possible, and
- Extracting valuable waste materials they used to pour down the drain.

Research aimed at these results began under EPA's predecessor agency, the Federal Water Pollution Control Administration in 1967, and continued under EPA's Industrial Pollution Control Division, headed by William J. Lacy.

Industrial research is now part of Research and Development's Office of Energy, Minerals and Industry, headed by Dr. Stephen J. Gage.

So far the program has funded nearly 250 different projects involving water use and wastewater treatment for products ranging from apricots to zinc. The projects are carried out by individual industries, industry associations, universities, State and city pollution control agencies, and private research organizations, under the supervision of EPA project officers at the Industrial Environmental Research Laboratories at Cincinnati and Research Triangle Park.

Fifteen projects have received national awards for their originality and effectiveness in reducing industrial pollution. Mr. Lacy, who is now senior engineering advisor to the Assistant Administrator for Research and Development, has an office wall covered with plaques and citations from industry associations and from conservation and sportsmen's groups interested in improving the water quality of lakes and rivers.

"Most industries want to stop polluting," Mr. Lacy said, "and not just because the new laws and regulations require it. Of course there are some notable exceptions.

"We try to encourage good environ-

mental practices for industries by supporting research in water conservation, recycling, and wastewater treatment. If a proposal looks promising on paper, that is, if it has some new and novel aspect and would be applicable to others in that industry, we can furnish 'seed money' to develop it. The EPA share of the cost includes the cost of operating, maintaining, and evaluating the system over the period of the grant, which is usually one year.

"If you are canning fruit you need an awful lot of water for preparation: washing, peeling, sorting, and so on. This water used to be all wasted. It was drained away loaded with skins, pits, dirt, and fruit pulp—organic solids having a very high 'oxygen demand' on the receiving waters."

Other industries that have high water use include pulp and paper making, textile dyeing, metal finishing of all kinds, cheese making, and brewing. Each has different problems in wastewater treatment; each has characteristic processes where water use may be curtailed and where particular materials may be reclaimed from the wastewater stream.

"Saving and reusing process water can mean money in an industry's pocket," Mr. Lacy explained. "Treating a mill's effluent water to conform to its discharge permit means that mill's engineers have to rethink their whole process; frequently they find better ways to do things, and this means saving materials and energy, saving money."

The division has made grants totalling about \$50 million in the eight years since the projects began. Its budget for the current year is about \$6 million, Mr. Lacy said. All projects result in technical reports which are made available to the industries and to the public. Here are some non-technical descriptions of typical Division projects:

**Zinc from rayon.** In spinning viscose rayon fiber a zinc compound is needed, although it does not become part of the fiber. EPA helped American Enka Corp., Enka, N.C., to develop a method of reclaiming about 99 percent of the zinc from the spinning bath waste and using it over again, at a yearly saving of nearly \$400,000. Zinc in waterways is extremely toxic to fish.

**Rolling mill wastes.** The giant rollers

that squeeze steel bars into thin sheets for auto bodies, appliances, and other products must operate in a constant spray of oil, water, and chemicals to cool and lubricate the steel. Working with several steel companies and industry groups, EPA has demonstrated ways of removing 90 percent of the oil and oxygen-consuming chemicals from rolling mill wastewater.

**Pickle liquor** is the unappetizing name of liquid used to clean a metal surface before something else can be done to it. Thin steel sheet must be pickled before tinning or varnishing for making cans. Wire must be pickled before rubber or plastic insulation can be applied. Pickle liquors are strongly acid and are bad for rivers. Even worse are the toxic metals dissolved in the liquor. Iron in the waste water makes streams run red. Copper, chromium, and other metals poison the water, as do many non-metallic chemical compounds like cyanide. EPA projects have shown how to remove 99 percent of the iron from a steel mill's pickling waste, iron that is returned to the mill and doesn't redden the water, and treatment for copper wire mill wastes that recovers the valuable copper and sulfuric acid.

**Food canning and freezing.** Many water-saving techniques have been developed by food processors with EPA support. Instead of dunking fruits and vegetables in hot water or steam to loosen the skins, and then tearing the skins off with streams of water, many packers are now using the "dry caustic" process, developed under EPA. After a hot alkaline dip, the peels are gently wiped off by rotating rubber rings. Water savings for apricots, peaches, and pears are as high as 93 percent. And it is easier to remove the organic matter when it is concentrated in a small amount of water.

**Closed-loop systems.** The ultimate in any processing system is the closed loop, with all material reclaimed and used again, as with the zinc in the rayon spinning mill mentioned above. Closed-loop water systems have been demonstrated by EPA-supported projects. One was the floatation transport of beets in a sugar factory (though this did not include other water uses). The other was in a plant making glass fibers, which have to be sprayed with a resin as they are collected as a blanket on a conveyor. Later, water was used to wash the resin off when it was no longer needed. The resinous water is now cleaned and reused, with new water

CONTINUED ON PAGE 17

# A LOOK BACK AT DDT

By Ruth A. Hussey

Ten years after Rachel Carson in "Silent Spring" sounded the tocsin of environmental alarm against the threat of DDT to human and animal life, an agency of the Federal Government, EPA, banned the use of this pesticide for almost all domestic uses.

On June 14, 1972, William D. Ruckelshaus, EPA's first Administrator, issued an opinion and a decision that "DDT poses an unacceptable risk to man and his environment" and thereupon cancelled its major uses. He stated

*"I am convinced by a preponderance of the evidence that, once dispersed, DDT is an uncontrollable, durable chemical that persists in the aquatic and terrestrial environments . . .*

*. . . The evidence of record showing storage in man and magnification in the food chain is a warning to the prudent that man may be exposing himself to a substance that may ultimately have a serious effect on his health."*

The data supporting this decision of three years ago, and the consequences of the ban recently have been reviewed in depth at the request of the House Appropriations Committee, which directed EPA "to initiate a complete and thorough review, based on scientific evidence of the decision banning the use of DDT." The committee instructed the reviewers to take into consideration "all of the costs and benefits and the importance of protecting the Nation's supply of food and fiber."

This new look at the 1972 findings generally substantiates EPA's action then. It also shows that risks are declining since the ban, that alternative pesticides are available and that economic impacts have been nominal, and well within the range of those projected.

The findings upon which Mr. Ruckelshaus based his decision to ban DDT followed a long and frequently acrimonious controversy over the use of the chemical. DDT, a member of the chlorinated hydrocarbon group, was first synthesized in 1874 but its effectiveness as an insecticide was not known until 1939.

During World War II and immediately afterwards the U.S. produced large quantities of DDT for control of insect-borne diseases such as cholera

and typhus in the war-devastated areas. In 1948 it won a Nobel Prize for Paul H. Müller, the Swiss scientist who discovered the compound's insecticidal properties.

After 1945, agricultural and commercial uses of DDT increased rapidly throughout this country. Its popularity stemmed from its cheapness, persistence, effectiveness, and its versatility in combatting a wide variety of insect pests. In the 30 years before its cancellation about 1.35 billion pounds of DDT were used in this country. In addition, large quantities were manufactured for foreign customers, the United Nations, and the Agency for International Development.

The use of DDT declined after 1959, dropping from a peak of about 80 million pounds per year to just under 12 million in the early 1970's. Ironically, the effective persistence of the pesticide, that encouraged its early and widespread use, later became the basis of concern over the possible hazards of its continued use. Although warnings against its indiscriminate use were voiced by scientists as early as the mid-forties, publication of Carson's book in 1962 triggered wide public anxiety over DDT. Throughout the past decade, proponents and opponents have clashed in a series of confrontations.

Proponents argued that no immediate adverse effects upon man have been proven and that alternatives are more hazardous to the user and more costly. Opponents argued that it is a persistent, toxic chemical which easily collects in the food web, posing a proven hazard to non-target organisms, such as fish and

wildlife and ultimately to man—who is at the very top of the food chain. From 1963 to the end of 1969, these arguments were considered by four prestigious Government committees; all four recommended an orderly phasing out, over a limited period of time, of the pesticide.

State regulatory actions placed restrictions on DDT use, and both the Departments of Interior and Agriculture increasingly limited its application. Then in December of 1970, major responsibility for federal regulation of pesticides was transferred to EPA, and DDT came under the close scrutiny of the new Agency.

In August 1971, upon the request of 31 DDT formulators, EPA began a hearing on the proposed cancellation of all remaining federally registered uses of products containing DDT.

When the hearing ended in March 1972, the transcript of 9,312 pages contained testimony from 125 expert witnesses and over 300 documents. The principal parties to the hearings were the DDT manufacturers and formulators, the Environmental Defense Fund, the Department of Agriculture, and EPA.

Mr. Ruckelshaus based his decision on findings of persistence, transport, biomagnification, and resulting toxicological effects and on the availability of less environmentally harmful substitutes.

The effective date of the ban was delayed until December 31, 1972, to permit an orderly transition to substitute pesticides; EPA and Agriculture jointly developed "Project Safeguard" a program of education in the use of the toxic organophosphate substitutes for DDT.

The report to Congress reviewing that decision from the viewpoint of 1975

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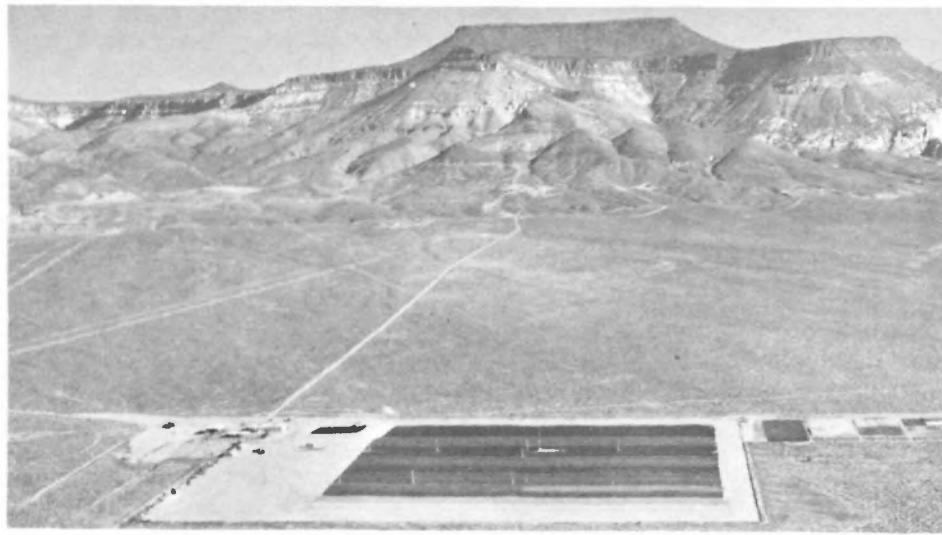


Young ospreys in the nest.

Ruth Hussey is a staff writer for EPA Journal.

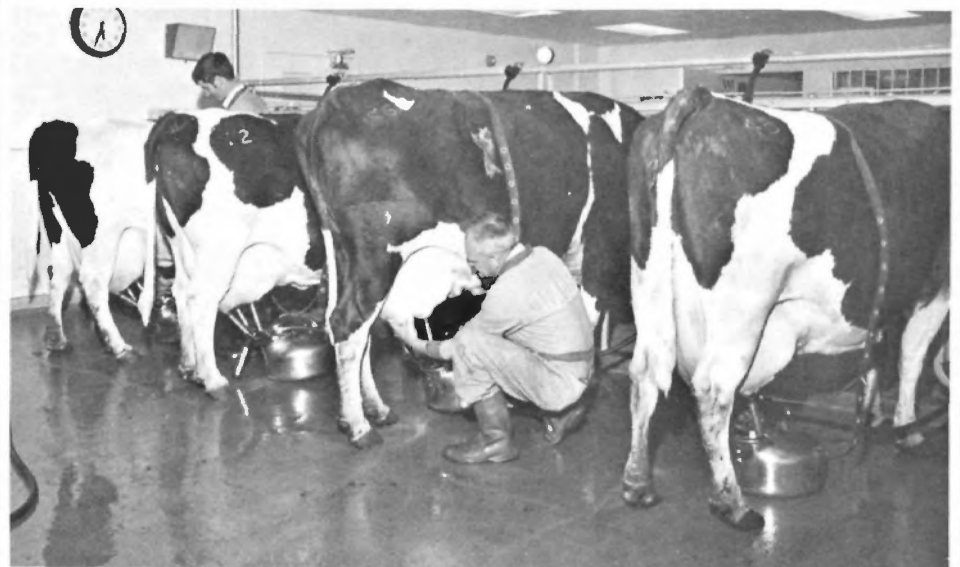
# PHOTO ESSAY

## EPA'S FARM IN THE DESERT



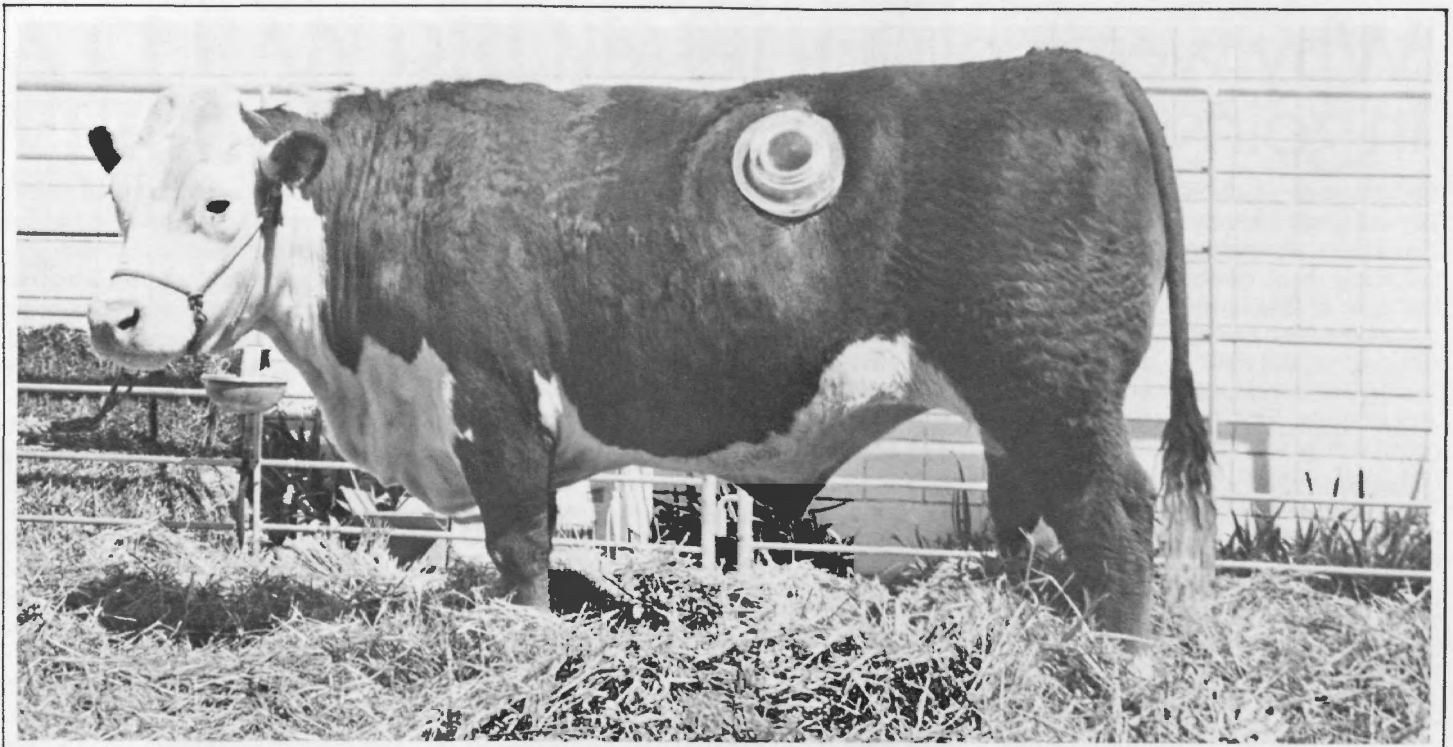
This is the 30-acre experimental farm, an oasis in the Nevada desert, which is managed by the Agency's Environmental Monitoring and Support Laboratory at Las Vegas for study of the impact of radioactive material in the environment. The farm, which supports dairy and beef herds and where vegetable and hay crops are grown, is located in the Nevada Test Site used formerly by the Atomic Energy Commission and now by the Energy Research and Development Administration for underground nuclear explosion tests. Data obtained by examining the farm's crops and herds has provided a better understanding of the complex behavior of radioactive material in the environment and its effect on living things.

Milking time for the dairy herd.

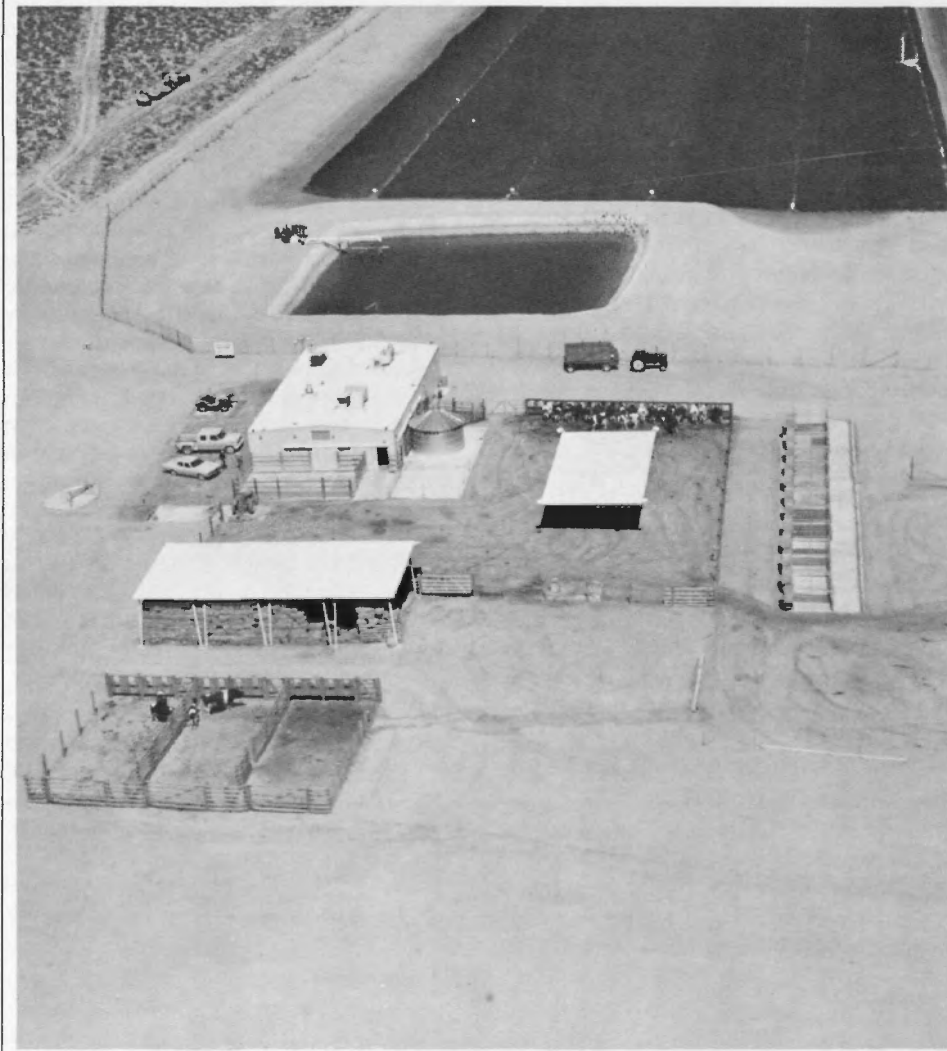


It's roundup time for the beef herd at EPA's experimental desert farm.





This is Big Sam, who underwent an operation in which a capped tube was installed into his forestomach through a surgical opening in his left side. The opening apparently causes no discomfort and permits periodic removal and examination of food the animal has eaten as he grazes on the Nevada Test Site.



The reservoir in the upper center can store one million gallons of water. The water is pumped from a 5,400-foot-deep

well to a sprinkler system needed to grow crops in this arid area.

Cattle feed is harvested while irrigation is provided by a sprinkler system.



# Why were you interested in going into research at EPA?

**Dr. Mildred Jean Wiester**, Research Physiologist, Health Effects Research Laboratory, Cincinnati, Ohio: "While attending the University of Cincinnati College of Medicine, I became acquainted with a number of physiologists working in the field of environmental health, and developed an interest in this area of study. EPA in Cincinnati holds a prominent place in this worldwide effort, and offered a variety of opportunities for scientific contribution. The need for accurate, pertinent health effects information related to urban air pollution has intensified over the last few years as the smog level has increased. A major part of this health-threatening smog has been attributed to automobile exhausts. It is satisfying to know that our research on catalytic-treated auto emissions will be used to back up stringent EPA regulatory actions aimed at reducing the public health hazards of smog, which is now approaching crisis proportions."

**Robert A. Olexsey**, Mechanical Engineer, Municipal Environmental Research Laboratory, Cincinnati, Ohio: "At this time it is difficult to envision a more interesting involvement than one in environmental research. For instance, in my area of responsibility, which is disposal of wastewater treatment plant sludges, some crucial capital investment decisions must be made in the next three years. The impending water quality standards dictate that greater volumes of these sludges will be produced right at the time when environmental concerns are limiting options for the disposal of this material. There are very real pressures for development of new, safe, and efficient handling methods for these sludges. I find that working in EPA research I am able to get a very broad view of developments in my area, since EPA re-

mains the center of information exchange in the environmental field. I previously worked in a large corporation, and, being such a minute part of the company, it was often difficult to see how the welfare of the organization was affected by my activity. At EPA, on the other hand, the subject matter is challenging and the atmosphere conducive to accomplishment."

**Dr. Jack W. Blanchard**, Office of Research and Development, Washington, D.C.: "The creation of EPA was a particularly fascinating challenge to me. Its goal of protecting the environment required a national effort to reverse 200 years of abuse to the country's natural resources. Doing this required a public understanding of the intent of EPA in backing up its rulings with reasoned scientific data to document the extent of the damage to the environment. I am involved with the integration of Agency efforts in health and ecological research programs, so that their results are incorporated into the technical basis for the establishment of standards, regulations and guidelines, the major tools available to the Agency in protecting our environment. Hopefully, if I've done my work well, the scientific findings of these efforts will be upheld in the courts. The end result will be a contribution to the improvement in our environment, the basic reason why I joined the scientific arm of EPA."

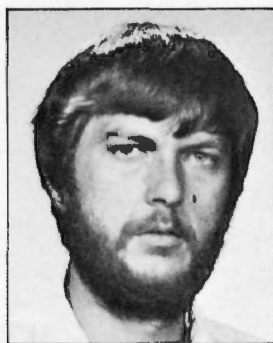
**Steve Plotkin**, Staff Engineer, Office of Energy, Minerals, and Industry, Washington, D.C.: "My work at EPA involves gauging the social, economic and environmental impacts of energy development in the western states. I find this work interesting and challenging for several reasons: it's interdisci-

plinary, requiring me to become familiar with work outside of my field (which is engineering); it's concerned with trying to prevent ecological problems before they happen; and it applies what we've learned in a variety of research projects to important EPA policy decisions. This kind of research asks questions which don't have hard answers. Typically, we have to balance factors that cannot easily be translated into dollars or some other common factor. How can decreasing visibility, drastic changes in lifestyle, or destruction of important wildlife habitats be traded off against a distant city's demand for energy? How can the seemingly irreconcilable desires of opposing interest groups—ranchers and coal miners, for instance—be adequately represented in an equitable solution? These are the kinds of questions I wanted to try to answer, and the type of work I wanted to do when I joined EPA."

**Dr. Jean French**, Research Epidemiologist, Health Effects Research Laboratory, Research Triangle Park, N.C.: "Preventive medicine has always been of primary importance to me, and I am firmly committed to the research charge of EPA which is to identify and quantify the health effects from exposure to environmental pollutants. EPA's research program provides the opportunity to work with a multidisciplinary team on highly relevant problems, and research findings are translated into action on behalf of protecting the public health. In my previous experiences as a faculty member in schools of medicine and in schools of public health, I was involved in very interesting research projects, but all too often the fate of research findings was limited to publication in a journal. Here at EPA one can see research findings used as a basis for setting standards designed to protect the public health."



Dr. Mildred Jean Wiester



Robert A. Olexsey



Dr. Jack W. Blanchard



Steve Plotkin



Dr. Jean French

# A CLEAN DRINK FOR VERMONT

By Paul Keough

The effectiveness of ozone gas and ultraviolet light as disinfectants for drinking water is being tested in Vermont, a State where drinking water quality problems are so severe that several communities are required to boil their water before drinking it.

Under a \$123,000 contract from EPA, the State Department of Health last month began a two-year demonstration program in six small municipal systems whose raw water comes from Lake Champlain. The study will compare the two unconventional disinfection methods with chlorination, both with and without prefiltering.

The ozone process involves creating the short-lived form of oxygen by electrical discharges in air and then dissolving the gas in the water. In the ultraviolet process, a thin film of water is exposed to ultraviolet light.

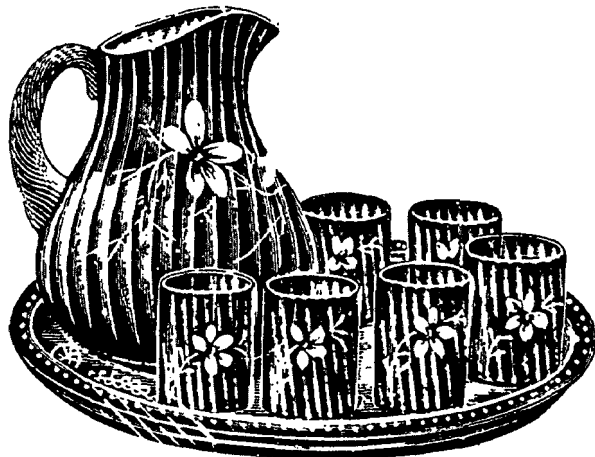
Neither method has the residual action of chlorine, which continues to kill bacteria long after it has been added to the water. Chlorine, however, is suspected

water supplies have no disinfection at all.

The finished water in many supplies in Vermont fails to meet the bacteriological standards of the State. For example, in Vermont during May, 1975, 371 systems were under surveillance by the State Department of Public Health. Two hundred met the U.S. Public Health Service bacteriological limits, and 171 did not. Vermont has 12 water systems on permanent boil water notice and an additional 14 systems on temporary boil notices at the present time.

Despite this, most Vermonters feel they have the best tasting water in New England and have opposed the chlorination of their water because of taste and odor problems, real or imagined.

Because of the poor bacteriological record of many small water systems in Vermont and the association of water quality with aesthetic acceptance of drinking water, EPA decided to fund a demonstration project which began last month to investigate methods other than



of contributing to the formation of certain harmful organic compounds in water.

Public water supplies in New England, for the most part, often are provided with no treatment other than disinfection, with chlorine being the most commonly used disinfecting agent.

Most New England large cities, as well as numerous small water systems, use surface water as their source of supply and depend upon the raw water quality of the source, together with disinfection, to provide safe water. Some small

chlorination.

All the water systems being tested use a common surface water supply, Lake Champlain, and each serves less than 500 people. Three of the systems provide treatment (filtration) and three provide chlorination only.

One treated system and one untreated system will each be equipped with ozonization disinfection and one treated and one untreated with ultraviolet disinfection. The other two supplies will be maintained with chlorination to serve as controls.

Weekly samples are being collected from each system of the raw water, treated and/or disinfected water and at distribution points. They are being

analyzed for total coliform organisms, fecal coliform organisms, and total bacteria, as well as selected chemicals and constituents pertinent to disinfection (ozone residuals, dissolved oxygen, temperature, turbidity, and acidity).

In addition, periodic samples will be collected in the raw and treated water for virological analyses. All bacteriological, physical and chemical analyses will be performed by the Vermont Department of Health Laboratories Division. Virological analysis will be performed under subcontract with the University of Vermont, Infectious Disease Unit.

Ozonization is not a new technique in water pollution control. Ozone waste water treatment processes have been used in some sewage treatment plants.

Ozonization is relatively inexpensive, but not as cheap as chlorine (although improvements in taste, odor, and color resulting from ozone purification will often more than offset the slight difference in cost).

What ozone will not do is persist as a residual germicide; in water it rapidly decomposes to ordinary oxygen. Ozone has about a 25-minute lifetime, and therefore, if the process is to be completely effective in treating water, small amounts of chlorine will have to be added. Only two places—Whiting, Ind., and Strasburg, Pa. are utilizing ozonization for treating drinking water although the process has been widely used in Europe.

The other process being examined is ultraviolet disinfection. In this process the radiation from the light kills the bacteria. No present public water supply is using this method. It has primarily been utilized aboard ships as a method of disinfection and some industrial users have experimented with the technique. It should be noted that the ultraviolet process for disinfecting water will not change the chemical and physical characteristics of the water. Ultraviolet treatment does not provide residual bactericidal action. Therefore, the need for periodic flushing and disinfection of the water distribution system must be recognized.

We hope the information gathered in the Vermont study will be applicable in other areas of the country having small community water supplies.

It is especially important that alternatives to chlorination be found. Recent EPA studies have indicated that the process of chlorination may be contributing to the formation of certain organic compounds suspected of being cancer causing. □

*Paul Keough is Director of Public Affairs for Region 1.*



### refinery for maine

The Maine Board of Environmental Protection has approved the application of the Pittston Company of New York to construct a 250,000-barrel-per-day refinery, storage facility, and marine terminal at Eastport. This is the first refinery proposal in New England to win State approval. Other proposals have been made by Occidental Petroleum, Atlantic Richfield and Olympic Oil. Region I officials have met several times with Pittston officials and their consultant to discuss the kind of information the firm's environmental impact statement should contain.

### paper mills fined

Civil penalties totaling \$30,000 were recently levied against two paper companies in western Massachusetts for not properly monitoring their wastewater discharges. Each had reported to EPA monitoring "data" that did not come from actual testing, Region I officials charged in complaints filed last February. The violations of the companies' discharge permits were discovered by EPA engineers during routine monitoring checks. The firms and their fines: Baldwinville Products, Inc., discharging into the Millers River, \$20,000, and Erving Paper Mills, discharging into the Otter River, \$10,000.



### enforcement actions

Five municipalities on Long Island have been ordered to curb emissions of particulate matter from their incinerators. Regional Administrator Gerald Hansler said that Valley Stream, Freeport, Garden City, Long Beach, and Sanitary District 1 in Lawrence must either shut down their plants and join Hempstead's waste disposal system or upgrade or build new facilities to correct the violations.

The Bendix Corporation's plant at Green Island, N.Y., was ordered to halt its emissions of asbestos.

Two New Jersey municipalities were ordered to correct wastewater discharge violations: North Bergen Township must apply for cleanup permits for three primary sewage treatment facilities to control discharge of raw sewage into the Hudson and Hackensack Rivers, and Camden must provide adequate operating staff at two of its sewage plants, repair broken-down equipment, and halt all bypass discharges into the Delaware River.

Civil penalties totaling \$2,835 were assessed on three firms for shipping unregistered pesticides: Givaudan Corp., Clifton, N.J., \$1,500; Jancyn Manufacturing Corp., Central Islip, N.Y., \$1,125; and Brilco Laboratories, Brooklyn, N.Y., \$210.



### fugitive dust

Region officials recently halted scarifying and sand-blasting operations on a completed portion of an interstate highway in Philadelphia because of excessive dust. Three contractors for the Pennsylvania Department of Transportation were removing a thin layer of concrete from Route I-95 so a special latex surfacing could be applied. Windblown dust from the machines caused many complaints from nearby residents. The companies were ordered to halt work until the machines could be altered or replaced to control the dust.

### chemical sale halted

Region III has ordered Life Science Products Company of Hopewell, Virginia, to stop the sale, use or removal of the compound Kepone.

Life Science is the nation's sole manufacturer of the chemical and is under exclusive contract to the Allied Chemical Corporation. Kepone is used to fight fire ants and roaches.

The order was issued in accordance with the Federal Insecticide, Fungicide and Rodenticide Act. An investigation was also begun to determine the health-related effects of Kepone as well as the extent to which it may be found in the water and on the land near the plant.

Further manufacture of the product was also prohibited since Life Science is not a registered pesticide-producer establishment.



### award to eglin

Eglin Air Force Base in Florida has received the Department of Defense's National Environmental Award for the best environmental program of any defense installation in 1974. The citation, presented by George Marienthal, former EPA official who is now Deputy Assistant Secretary of Defense for Environmental Quality, noted the base's work in abating pollution, protecting natural areas, and including environmental considerations in decision making. Representing Region IV Administrator Jack Ravan at the ceremony was Art Linton, Chief of Federal Facilities.



### energy seminar

Problems that will result from developing new energy supplies in the Midwest will be discussed at a seminar in Chicago this month, sponsored by EPA, the Federal Energy Administration, and the Chicago District Council of the American Society for Testing and Materials. "Energy Development and the Environment" is the topic of the half-day session starting at noon Oct. 16 at Sheraton Inn-O'Hare South.

### monoxide orders

Citing growing concern for public health and the improvement of air quality in downtown Chicago, Region V recently issued four orders to the city and Cook County designed to reduce carbon monoxide pollution in the Loop district. The orders require the city to establish a computer-controlled traffic signal system and restrict parking to one side of 10 designated streets during business hours. Both city and county were ordered to require inspection systems for monitoring vehicle exhausts. The actions followed formal notices of violation issued last April to the city, the county, and the Illinois Secretary of State.





### train trip crowded

Administrator Russell E. Train's two day-visit to Region VI in August was hectic but productive, according to Regional Administrator John C. White.

On the first day he addressed the regional office staff, held a press conference for Dallas and Fort Worth print and broadcast media, had a question-and-answer session with the Dallas Chamber of Commerce, gave a luncheon talk to the North Central Texas Council of Governments, dedicated the Dallas White Rock sewage treatment plant, met with city officials, and concluded with an evening speech at a meeting of environmental and conservation groups.

Mr. Train's second day, in Houston, began with a live television interview. After a meeting with Mayor Fred Hofheinz and a press conference at City Hall, he attended a meeting of the Environmental Committee of the Chamber of Commerce and spoke at a luncheon meeting of the Exchange Club. Mr. Train's Houston tour included a boat trip down the Houston Ship Channel and a visit to the San Jacinto Monument.



### spill seminar

Representatives of six regions attended a training seminar in Kansas City recently on a new computerized data system for keeping track of oil spills. The system, used mainly as a reporting and enforcement tool, was explained by headquarters specialists from the Management Information Systems Branch and the Oil and Special Materials Control Division. Any oil spill greater than 1,000 gallons or any second spill within a year from one source will trigger the data system to request review of that source's spill control plan.

### looking for ideas

EPA was on the listening end Sept. 11 in Omaha, Neb., when citizens gave their views on how to handle discharge permits

for small feedlots and municipal storm sewers.

These two kinds of point-source water pollution have been exempt from EPA's discharge permit program, but a Federal District Court ruling in Washington last June ordered the Agency to draft permit regulations for them and two other types by Nov. 10.

"Inclusion of these categories would make the paperwork monumental for EPA and the States at a time when we are undergoing manpower cuts," said Regional Administrator Jerome H. Svore.



### salty colorado

By Oct. 18 seven States in the Colorado River basin are expected to submit salinity standards for their portions of the river and its tributaries and also plans to meet the standards. The States are Arizona, California, Colorado, Nevada, New Mexico, Utah, and Wyoming.

Serious efforts to control salt in the Colorado date back to the early '60s when the Public Health Service began to study the causes, effects, and possible control measures. Salt in the river adversely affects irrigated crops and municipal water systems in the down-river States and Mexico, and the United States has agreed to guarantee that Colorado water leaving this country will be of a quality acceptable to Mexico.

After many interstate and interagency conferences on the problem, the Bureau of Reclamation has four projects under way to develop ways of reducing groundwater salinity (from salt rock formations), salt and sediment in water that drains back to the river from irrigated land, and salt from geysers.



### traffic control jam

EPA's plans for reducing urban air pollution by limiting auto use hit a snag recently in the U.S. Court of Appeals, Ninth District.

The court ruled that EPA has no authority under the Clean Air Act to order a State to make and carry out transportation control plans and become liable to sanctions under the Act for failure to do so. The case concerned EPA's orders that California implement programs for vehi-

cle inspection and maintenance, retrofit of pollution control devices, car pooling, and exclusive bus lanes.

The court said Section 113 of the Act nowhere provides that enforcement may be taken against a State for failure to carry out a plan promulgated by EPA, and it mentioned the delicate scheme of the Act and the need for joint Federal and State cooperation.

"The court told EPA to open its eyes and look at the world as it is," Deputy Regional Administrator Russell Freeman commented. "This means that if we are to solve environmental problems, we have to treat State and local governments as part of a team to implement the solution, rather than treating them as part of the problem."



### strings attached

Metropolitan Seattle recently got the green light and Federal money for a big sewer project only after impact statement review and public hearings had caused the municipality to alter its plans. The \$4.5-million grant to begin construction of a four-mile interceptor sewer line was awarded with strings attached: the line must go around instead of through 20 acres of wetlands in the Green River valley.

Region X Administrator Clifford V. Smith said the rerouting and other requirements to protect the environment followed suggestions made by the President's Council on Environmental Quality and several local conservation organizations.

"This demonstrates that the environmental impact statement process works," Dr. Smith declared. "It was a good project to begin with, and the additional grant conditions make it even better."

### park sewers

Region X will prepare an environmental impact statement on a proposal to build sewage facilities in the Island Park area of Fremont County, Idaho, Regional Administrator Clifford V. Smith has announced.

"We want to examine carefully how sewer lines and treatment lagoons proposed by the county commissioner would affect an area rich in wildlife and recreational opportunities," he said. Island Park is in the northeast corner of the State and is considered similar to Yellowstone and Grand Teton National Parks.

# PEOPLE



**William J. Librizzi, Jr.** has been named Director of the Surveillance and Analysis Division, Region II.

Based in Edison, N.J., the Surveillance and Analysis Division directs, coordinates and implements all field and laboratory studies for the Region.

Mr. Librizzi has been with EPA and its predecessors since 1966. For the past year he has been Chief of the Emergency Response and Investigations Branch, responsible for EPA activities during emergency episodes such as oil spills, hazardous material exposure, and national disasters. He directed a national watercraft waste research program and was instrumental in developing legislation for treatment systems for sanitary waste aboard ships and small vessels.

Before coming to EPA, Mr. Librizzi was a public works engineer at McGuire Air Force Base, Fort Dix, N.J. He has a master's degree in Sanitary Engineering from New York University and a bachelor's degree in Civil Engineering from the Newark College of Engineering. He replaces Richard Dewling who is on leave on EPA's Executive Development Program doing graduate work at Rutgers University.



**Dr. Gerald R. Bouck**, Aquatic Biologist at EPA's Western Fish Toxicology Station, Corvallis, Ore., has been elected president for 1976 of the American Fisheries Society's Western Division, which includes the area from Hawaii to Colorado and Alaska to Mexico. He will serve also on the International Executive Committee of the American Fisheries Society during this time.

Dr. Bouck has already served AFS as chairman of the Board of Professional Certification, and as chairman of the International Committee on Pollution Abatement and Water Quality. In addition, EPA has awarded him a silver medal for superior service in the development of the Western Fish Toxicology Station.

**John A. Little**, has been named Deputy Regional Administrator of EPA's Region IV in Atlanta.

Mr. Little, a native of Atlanta, has been the director of the region's Surveillance and Analysis Division for the past four years. He succeeds John C. White, now Region VI Regional Administrator.

In announcing the appointment of Mr. Little, Regional Administrator Jack E. Ravan said:

"We feel indeed fortunate to have a man of Alec Little's caliber for this position. He was selected from some 26 applicants here in the region and across the nation."

Mr. Little, who has been in pollution control work with the government since 1939, began his career in Kansas City. Training for his specialty came at Georgia Tech and the University of California at Berkeley. He received a bachelor's degree in civil engineering and a master's degree in sanitary engineering from Georgia Tech. At Berkeley, Mr. Little continued post-graduate work in sanitary engineering for two years.



**Arl B. Williams** has been appointed Deputy Director of Administration for EPA operations in Research Triangle Park, N.C. A native of Memphis, Tenn., he spent the last two years as Director of the North Memphis Community Health Organization, and has also been associated with Richard Fleming Associates, a management consultant firm in Memphis.

Prior to that time Mr. Williams was with EPA in North Carolina as the Equal Employment Opportunity Officer and Acting Personnel Director. His previous experience was in personnel and labor relations with Xerox Corporation in Rochester, N.Y.

Mr. Williams received his bachelor's degree in economics, with honors, from Benedictine College, Atchison, Kansas. He earned his Doctor of Jurisprudence from the University of Notre Dame Law School in 1969.



Deputy Administrator **John R. Quarles, Jr.**, congratulates **Olga Clegg**, daughter of Clara Williams of the Headquarters Research and Development Office, upon receiving an award from the EPA Scholarship Fund. Miss Clegg, who was accompanied at the ceremony by her mother, is a student at Indiana State University and is majoring in political science.

She is one of 30 children of EPA employees attending colleges across the nation who received a total of \$8,050 from the scholarship fund in individual awards ranging from \$100 to \$500.

Money for the fund comes from honorariums given to EPA officials for making speeches to different groups and writing articles for various magazines.

Since by law government personnel cannot accept fees for speeches or articles connected with their work, such money must be donated to charitable causes. Thus, the EPA Scholarship Fund was set up four years ago, Mr. Quarles said, in order that any honorariums collected "be used in the best possible way we could think of, the advancement and education of our children."

Requirements for the awards are that the student be in attendance at a four-year undergraduate college and be the child of a current EPA employee. Awards range in size from \$100 to \$500, depending on financial need and academic achievement.

Because the fund grows each year, the number and dollar amounts of the awards increase also. Applications and brochures explaining the scholarship in detail are available at all EPA Personnel Offices, and all EPA employees with children attending college are encouraged to apply.

Other recipients of this year's awards are: Mary Jo Poskin, daughter of Joseph Poskin, Region VII; Theodore Jones, son of John T. Jones, Cincinnati; Lynne MacDonald, daughter of Eleanor MacDonald, Corvallis; Debra Kaplan, daughter of Bea Kaplan, Headquarters; Teresa Stankis, daughter of Glenn Stankis, Region VI; Joanne Bader, daughter of Janice Bader, Cincinnati; Paul and Thomas Gehring, sons of Robert Gehring, Cincinnati; Alice Terry, daughter of Abbie Terry, RTP; Gina Loretta Regalbuto, daughter of Constantino Regalbuto, Indiana District Office; George R. Gillis, Jr., son of George R. Gillis, Sr., RTP; June Fleming, daughter of Patricia Fleming, Las Vegas; Tedi Wright, daughter of Jean Wright, Headquarters; Walter J. Kocal, Jr., son of Walter Kocal, Sr., Region V; Carol McGowan, daughter of Anne McGowan, Cincinnati; Karen Soper and Albert Soper, Jr., daughter and son of Albert Soper Sr., Narragansett Water Supply Lab.; Barbara Rizzardi, daughter of Charles Rizzardi, Las Vegas; Kurt Olsen, son of Agnes Olsen, Region VI; Marc Armel, son of Gerald Doran, Las Vegas; Eileen McGowan, daughter of Anne McGowan, Cincinnati; Walter Beasley, son of Alma Beasley, Headquarters; Arleen Braxton, daughter of Herbert Braxton, D.C. Pilot Plant, Headquarters; Cynthia Jones, daughter of Johnnie Jones, Headquarters; Kary Free, daughter of Eva McGough, Las Vegas; Anita Williams, daughter of Clara Williams, Headquarters; Connie Quinlan, daughter of Frances Quinlan, Cincinnati; Jacques Fleming, son of Patricia Fleming, Las Vegas; Newell S. Mastin, son of Newell J. Mastin, Cincinnati. □

## RESEARCH HELPS INDUSTRIES

*CONTINUED FROM PAGE 8*

added only as the old water evaporates. Plant engineers calculate they use the water four or five times, cutting their city water bill about in half.

**In their own juice.** A plan to float tomatoes in their own juice has been proposed by Mr. Lacy, and Dr. Walter Mercer of the National Canners' Association is looking for a plant to try the method next year. The idea is for a packer of both canned tomatoes and tomato juice to use the juice as a conveyor belt; at the end of the line the whole tomatoes would go in one direction, and the juice in another, to their respective canning machines.

**Dyes.** One of the stubbornest of all water pollutants is the dye that misses the yarn or cloth in a textile factory. When a mill's run is a single color the waste stream is that color, purple, yellow, red, green, or whatever. When many colors emerge at the same time the result is like the mud you get when you mix all the colors of a painting set. A variety of ways to remove dye from wastewater is being explored, and some have achieved 98 percent removal. This is welcome news to the industry, because dyes are very expensive, and any dye that can be recovered will be used again.

**International.** For the last two and a half years the Polish Institute for Meteorology and Water Economy has been studying wastewater treatment at a textile factory in Krakow, using blocked currency funds—U.S. credits in zlotys that can be spent only in Poland and are therefore outside EPA's budget. The design of the experiments is approved by EPA. The project officer, who makes periodic visits to Poland to supervise the work, is Thomas N. Sargent, of EPA's Athens, Ga., laboratory. □

DR. ALBERT

*CONTINUED FROM PAGE 5*

nious system where he adds those cellular components from the liver that actually do the metabolizing into the test dishes which contain the bacteria. In this way, one can evaluate the active form of the agent.

Commoner is utilizing this test system, and I think this, of course, is an important development in screening for potential environmental carcinogens on the basis of their mutagenic activity.

But I think there has to be a note of caution here, because a test in a simplified system such as this, while it is most useful in raising the warning flag of possible importance as an environmental carcinogen, has to be substantiated by other tests in order to warrant actual intervention, at least at the present time.

QUESTION: Was this work by Dr. Commoner done under a contract with EPA?

DR. ALBERT: Yes.

QUESTION: Is that work still continuing?

DR. ALBERT: Yes, it is. And it is only fair to say that there is work in similar directions that is being supported by other agencies, both at National Institutes of Health, and in universities.

I think this is an important area that needs to be developed, and all these different research efforts are highly desirable.

QUESTION: What do you regard as the top priorities in your new position?

DR. ALBERT: The major priorities that I feel are of importance are of two sorts. One relates to the internal management of the research program in health and ecology; how we do our research and how we plan for it. The other priority is choosing our research projects and deciding which of them are the most important.

There is a great deal to be done in improving the internal management of the research program in the sense of getting a better interaction with the program offices, and making the research more relevant to the actual regulatory needs of the Agency. And when I say program offices, I should also include the regional offices, because these are the cutting edge of the Agency in terms of implementation, and they have problems which also require solution by research.

I have found in the short time I have been here that there has been a lack of adequate communication between the

research program and the other program and regional offices in terms of transmitting their needs, and translating them into the research that will really contribute to the solution of problems that relate to the setting of standards and regulations.

There are also other problems that require solution in terms of the management of the research program. I think there has been inadequate involvement of the university scientific community in the formulation of the research, and inadequate utilization of outside talents in carrying out the research program. And I think this needs to be improved.

A second area has to do with perception of shifting areas of importance. And I would guess that there is an increased need for more research in carcinogens in the environment, and other agents which produce long-term, delayed deleterious health effects.

The issue of control of environmental carcinogens has rapidly come to the fore in EPA. There is a substantial effort to increase the scope of the EPA's research program, both in characterizing carcinogens, developing a better understanding of dose-response relationships, and improving methods of determining what agents are carcinogenic.

QUESTION: Do natural sources of smog from vegetation contribute significantly to polluted air?

DR. ALBERT: There have been air pollution episodes where there is evidence that hydrocarbons emitted by vegetation played a substantial role in formation of oxidants and other irritants in the atmosphere.

This is a research area which is just beginning to emerge. We don't have a really clear picture of the importance of it. I would guess it will be found that hydrocarbons released by vegetation provide a significant contribution to the oxidant problem.

QUESTION: Does this mean that we should be able to relax our controls on auto pollution, for example?

DR. ALBERT: No, it certainly doesn't mean that. It means that we are going to have to deal with a complex situation which will make the control problem more difficult.

QUESTION: How much hard proof is there that use of aerosol spray cans destroy ozone in the upper atmosphere, in your judgment?

DR. ALBERT: I am not an expert in this field. I have heard presentations of the interactions that would occur in

the stratosphere, and to me they seem persuasive.

The issue of whether there is hard proof is not exactly to the point here, because by the time that we have clear evidence that the ozone layer has decreased and consequently the ultraviolet radiation reaching the surface of the ground has increased, it will be a bit too late. So it is a particularly difficult situation in which there is strong reason to believe that damage can be done by an excessive amount of Freon in the stratosphere.

It calls for some pretty close watching to avoid a situation where damage has been done, and it is too late to correct it.

QUESTION: Why did this post at EPA seem worthwhile to you?

DR. ALBERT: The way that the matter was presented to me was that the research program, particularly in the health effects area, was in substantial need of improvement. There has been a lot of criticism of it both in terms of the scientific aspects, and also in terms of its relevance to the needs of the Agency.

I was told by several of the directors of the National Institutes of Health that my coming here would be an important contribution to the EPA and to the country in what I could do to improve the research program.

QUESTION: How many people and how much money is available for your program?

DR. ALBERT: The program that is managed from this office includes both health and ecology research. The total budget is in the order of \$60 million, and the numbers of people involved in the laboratories is in the order of 700 to 800 people.

QUESTION: Are these resources adequate?

DR. ALBERT: I think this can be answered in a number of ways. I have never heard a bureaucrat say that he did have enough money, and even though I am a novice bureaucrat, I will join the crowd. So the answer is no.

I think it is perfectly evident that the amount of funds invested in research in the EPA program in health and ecology are being well spent. There are areas of research that would be exceedingly valuable to encompass if we had additional funds and people. The lack of resources I think has a serious impact on the contribution that the research program can make to both the EPA's tasks and to the health of the country. □

## RESEARCH MISSION

### CONTINUED FROM PAGE 3

comprehensive approaches to integrating all environmental programs in an efficient manner, utilizing land use management as the basic integrating mechanism. For example, methods are being developed to assess the environmental impacts of sewer and transportation systems on community growth. Also, methods for integrating regional air and water quality planning efforts are under way.

**E**nergy extraction and processing technology covers the assessment of problems and development of control techniques to mitigate the environmental impact of the mining and processing of coal and other energy resources. Solid, liquid, and gaseous fuel as well as such non-fossil energy sources as uranium and geothermal sites are considered. The range of problems considered spans the spectrum from assessment of the socio-economic aspects of resources extraction and good practice in off-shore drilling to abatement of acid mine drainage and coal cleaning.

**E**nergy conversion-utilization technology assessments is the category aimed at assuring adequate energy production from fossil fuels with minimum damage to environmental quality. After assessing environmental impacts, this program identifies, develops, and demonstrates the required pollution control technology for present and emerging energy systems.

For example, our Industrial Environmental Research Laboratory at Research Triangle Park has been developing and demonstrating flue gas desulfurization technology, commonly known as stack gas scrubbers. These units can be used to control sulfur dioxide emissions from stationary sources, with particular emphasis on coal-fired electric power plants.

Integrated technology assessment is required to identify significant technology gaps and provide information for important policy decisions. The assessment must include environmental, energy, economic, and social factors.

**E**nergy health and ecological effects include those research efforts necessary to determine the environmental effects associated with

energy extraction, transmission, conversion, and use. With this knowledge, measures can be taken to protect human health and welfare, the ecosystem, and social goals while increasing energy production.

**M**easurement, techniques and equipment development research provides methods which serve as the Agency's "eyes, ears, and nose." Some of the more immediate needs of the Agency concern environmental monitoring. After all, if we can't be sure a pollutant is there, how are we to control it?

In this program, physical, chemical, and biological principles provide the basis for development of procedures and instruments to measure pollutants. These procedures and instruments are then used by the Agency in its monitoring networks.

As an example of how this program works, we may find that we need to routinely measure a newly identified environmental pollutant such as vinyl chloride. Vinyl chloride is a colorless gas which recently was identified as the industrial chemical responsible for causing a kind of cancer in industrial workers. A procedure to measure vinyl chloride was developed by our monitoring program in cooperation with the regional surveillance and analysis laboratories. This system was used by the regions in a national monitoring survey to evaluate the vinyl chloride problem. The analytical procedure is currently being refined in our laboratories under the measurement, techniques, and equipment development program.

**M**onitoring quality assurance serves all environmental monitoring activities of the Agency. Its purpose is to assure that monitoring data used to support the Agency's regulatory programs are scientifically sound and legally defensible.

To illustrate this problem area, consider a butcher weighing a piece of meat. If he were to take the same piece of meat and repeatedly weigh it, each successive weighing would be different from the others. If he used a good balance, these differences would be small and there would be no cause for alarm. However, if the differences were large, the customer could become very distressed.

It is the purpose of the quality assurance program to standardize the measurement procedures to reduce the varia-

tions in such successive measurements to acceptable differences. The quality assurance program also provides standard reference materials of certified purity and reference samples of known concentration so that analysts can check the accuracy of their analyses. Quality control guidelines and manuals are developed to assure uniform analytical practices. Finally, the quality assurance program provides for evaluation of laboratories for the adequacy of their facilities and the competencies of their technical personnel.

**T**echnical support is also provided by our research program to other elements of the Agency. This is usually not research per se; it is mainly the application of our findings in all fields, and the lending of our research scientists and our research facilities to other parts of the Agency for their immediate or unusual needs.

These needs may be for technical information, for the evaluation of a particular pollution control problem, for a surveillance or monitoring job in one of the Regions, or perhaps for monitoring and control of an emergency pollution episode. Identification of this function as a distinct activity reflects a determination that we will continue to be responsive to the immediate needs of the Agency.

Taken together, these 14 program areas are the totality of our research program. The specific content of any area is based on a number of fundamental factors.

First and foremost is the full recognition that research serves a support function within the regulatory Agency. Our strategy, specific objectives and priorities should not and cannot stand as entities in and of themselves. Rather, they must derive from those of the Agency in the accomplishment of its total legislative mandate.

The program, then, is one of mission-oriented research and not one of so-called basic research. This is not to say that some very fundamental research is not, in fact, an integral part of our program. It is and must continue to be so because of our responsibility to provide the best scientific data and to develop control systems for pollution problems that are beyond the present state-of-the-art. Further, a most important research function is to anticipate the problems that will emerge in the future and—if we cannot prevent them—tag them so that they will not arrive unheralded. □

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data, centers on the key findings of the Administrator's decision. The responsibility for the initial assemblage and evaluation of the information was given to the Criteria and Evaluation Division, Office of Pesticide Programs; within the Division, the lead person was Dr. Arnold Aspelin, Chief of the Economic Analysis Branch, since much of the review concerns economic and social matters.

The report assessed findings from the original hearing in terms of data from available published literature and also data from scientists in various EPA offices and laboratories and from other agencies of government, including the Departments of Agriculture and Interior and the Food and Drug Administration. However, the completed document was not circulated for review or clearance by other agencies.

Multidisciplinary teams worked in four major areas: fish and wildlife effects; human effects; residues of DDT in the environment and man; and economic aspects. In each area, review was made of the information available to the Administrator in support of his findings in 1972, and information searches, using relevant data banks, were made for more recently published articles and current research projects in EPA and elsewhere. For example, in an effort to obtain the most current data and research results in the fish and wildlife area, almost 500 articles, on the reproductive, behavioral, lethal and sublethal effects of DDT were reviewed. This literature survey was reinforced by intensive field interviews with people engaged in active research.

In general the study confirms the data and basic findings upon which EPA made its 1972 decision on DDT. Reported studies show that human dietary intake of DDT in the U.S. has declined from 15 micrograms per day in 1970 to 1.88 per day in 1973. They confirm that DDT is a carcinogen in mice and should be considered a possible cancer agent in man.

The cancellation in 1972 has contributed to a decline in DDT levels in fish and wildlife. One study, on Lake Michigan trout demonstrates that DDT levels decreased from 19.19 parts per million in 1970 to 9.96 ppm in 1973. DDT levels in Coho salmon went from 11.82 ppm in 1969 to 4.48 ppm in 1973. Other findings note that DDT residue levels have declined in some birds e.g. songbirds and ospreys, but are still high enough to adversely affect other species, especially flesh-eating birds like eagles and hawks.

The brown pelican, an intensely studied species of wildlife adversely affected by DDT and its derivatives, has shown some improvement in its reproductive capacity since the ban of DDT. But according to James O. Keith, of the Denver Wildlife Research Center, who has been involved in the on-site study of West Coast pelicans for many years, "the average productivity of brown pelicans in the Gulf of California during the last five years appears to be inadequate to maintain their population."



American Bald Eagle

Despite the sharp decline in DDT use, only a gradual levelling out of DDT residues in soil can be anticipated, the study concluded. Persistence in aquatic ecosystems of DDT and its derivatives (DDE and TDE) has been well documented, and long-term studies support the conclusion that contaminated waters and sediments will take many years to purge themselves. The simple food chain (soil—plant—animal—human) accounts for most of the DDT found in man where it is stored in body fat. The average DDT level in fatty tissue declined from 7.85 ppm in 1971 to 5.89 ppm in 1973, and this may signal a downward trend, assuming no return to the widespread use of DDT.

Assessing the economic impact of the cancellation, the report concludes that for most crops, including cotton which formerly accounted for 80 percent of DDT use, production has been maintained and the increased production costs have been borne without severe disruption of either the regional or national economy. It is estimated that nationally the cost of switching to alternative pesticides has cost cotton farmers slightly more than \$1.00 per acre per year. However, in the southern U.S. this increases to an additional \$6.00 per acre yearly. For the consumer, the cost of cotton goods since discontinuation of DDT, has increased approximately 2.2¢ per person per year.

At the time of the ban alternate pesticides were available and since then others have been identified. These substitutes include methyl parathion, malathion, guthion, azodrin, crotoxyphos, methomyl, diazinon, meth-

oxychlor and others. In most cases, they have been effective in controlling pests and economical to use, according to the report.

Substantial economic and environmental benefits can be obtained by use of the least hazardous ones and by their use only when the level of infestation actually justifies use. Recently, EPA and the Department of Agriculture have developed and promoted "integrated pest management" programs that combine the improved use of chemicals with non-chemical agents of control.

The report notes that the Agency has attempted to administer the DDT cancellation with flexibility, paying special attention to emergency situations. For example, emergency uses of DDT were granted by EPA in 1974 to safeguard timber in the northwestern U.S. from the tussock moth and to control the pea leaf weevil on the dry pea crop in the States of Idaho and Washington. Last fall, in a separate action, substantial amounts of Maine timber were saved from spruce budworm damage by EPA's quick registration of two DDT substitutes.

This spring Administrator Train turned down a request by the State of Louisiana for emergency permission to use 2.25 million pounds of DDT to control the tobacco budworm insect on 450,000 acres of cotton. In denying the petition, Mr Train stated that the environmental and public health risks that would result from the DDT use would outweigh the potential benefits, and that other controls were available to Louisiana farmers, including integrated pest management procedures and alternative pesticides (i.e., Galecron, EPN, and methyl parathion).

DDT is of minor importance for public health pest control in this country. However, if an emergency arises, DDT may still be used, under the EPA cancellation order, to control disease-carrying insects. The main use of DDT abroad is as an inexpensive method of malaria and typhus control.

A document of some 300 pages, the report to Congress is entitled "DDT: a Review of Scientific and Economic Aspects of the Decision to Ban Its Use as a Pesticide." In addition to the text marshalling the evidence upon which its conclusions are based, it contains four appendices, and extensive bibliographies of the reference literature cited. A limited number of copies are available, upon request, from the Publications and Technical Literature Research Section (WH 569), Office of Pesticide Programs, EPA, Waterside Mall, Washington, D.C. 20460: tel. 202-426-2432. □



# news briefs

## EPA TESTS SHOW 12.8% MILEAGE GAIN FOR 1976 AUTOS

New automobiles tested in EPA's Ann Arbor, Mich., laboratory averaged 12.8 percent more miles per gallon than 1975 cars. Coupled with last year's gains, this will mean a 26.6 percent improvement over 1974 models, or more than half way toward President Ford's goal of a 40 percent gain in average miles per gallon by 1980. Test results, by make and model, are listed in the "1976 Gas Mileage Guide for New Car Buyers," available free, after Nov. 1., by writing to Fuel Economy, Pueblo, Colo., 81009.

## EPA SUPPORTS NATIONAL RETURNABLE BOTTLE LAW

Selling beer and soft drinks in refillable bottles rather in throwaway bottles and cans saves energy and materials and reduces waste, EPA believes. The Agency has also announced that while it favors a nationwide mandatory deposit law for soft drink and beer containers, EPA does not oppose State and local efforts such as those in Oregon and Vermont which have dramatically reduced roadside litter. In supporting a national returnable bottle law, EPA has recognized that it should be implemented in stages to avoid adverse employment and economic effects.

## QUIETER LANDING RULES PROPOSED FOR AIRLINERS

New approach and landing procedures designed to reduce noise near airports have been proposed by EPA to the Federal Aviation Administration. They would require pilots of jet aircraft to use a steeper glide path, so there is less close-to-ground flight, and consequently less noise heard on the ground. The steeper-glide approach is already used by certain airlines at certain airports.

## MILLER NAMED TO A TOP ENFORCEMENT POST

Jeffrey G. Miller has been named Deputy Assistant Administrator for Water Enforcement. He was formerly Director of the Enforcement Division of Region I in Boston. Mr. Miller was graduated with honors from Princeton University in 1963. He is a member of Phi Beta Kappa. In 1967 he was graduated with honors from Harvard Law School and is a member of the American, Massachusetts and Boston Bar Associations. Prior to working with EPA, Mr. Miller was an associate with the law firm of Bingham, Dana and Gould of Boston, Mass.



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# CLAMS, FISH, SOIL HELP PURIFY WATER

By Eddie Lee

Clams and fish, sunshine and soil, and bullrushes and cattails are all being used in the search for new and better ways to cleanse wastewater in projects directed by the Robert S. Kerr Environmental Research Laboratory, Ada, Okla.

One of the systems recently receiving major attention is called the "overland flow" method. Under the supervision of Richard E. Thomas, the laboratory has been operating two pilot-scale systems for three years with excellent results and has recently expanded the pilot operation.

"The overland-flow method is capable of providing advanced treatment of wastewater in an inexpensive, highly reliable fashion and is particularly suited to small communities in mild climates," Mr. Thomas said.

Under the direction of Dr. William R. Duffer, the experiments with clams, fish, bullrushes and cattails are designed to improve the effectiveness of other treatment systems ranging from the new overland-flow method to the more conventional lagoon treatment.

The overland-flow method is simple. Raw sewage is sprinkled in controlled amounts along the top of a gently sloping plot of land. The wastewater flows slowly and evenly down the slope, exposed to the sun and the action of soil bacteria.

Suitable vegetation planted on the plot, such as Bermuda grass, slows the drainage, absorbs organic materials and nitrogen, and probably speeds the purifying action of the soil bacteria.

At the Ada field site, the experiments

with native fresh water clams are aimed chiefly at the removal of suspended solids in ponds holding treated waste water.

Dr. Duffer described the clams as "filter feeders" and explained that as they feed they filter out such suspended materials as algae and possibly nutrients and microbial materials.

"The purpose of the experiments is to determine just how useful they will be for existing lagoon systems and the overland-flow method in some situations," he said.

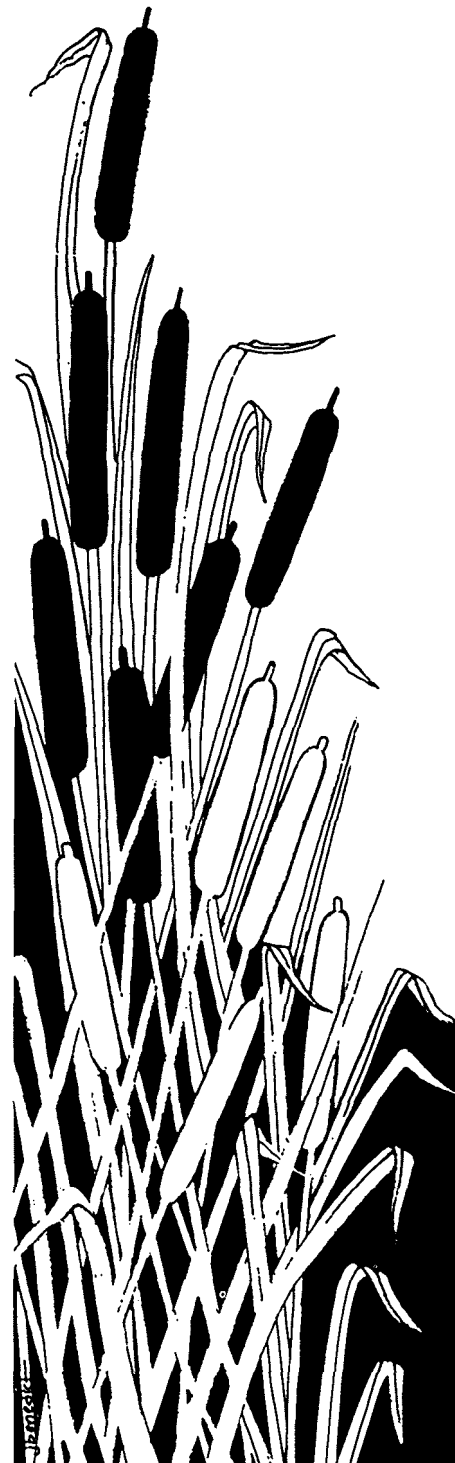
All of this research work under the Wastewater Management Branch of Ada is directed by Dr. Curtis Harlin Jr. Working with Mr. Thomas and Dr. Duffer on the projects are Bert Bledsoe, Dr. Carl Enfield, Curtis Gillaspay, Kenneth Jackson, Lowell Leach, Lowell Penrod and Robert Smith, all stationed at Ada.

Talpia, a fish native to Africa which is a prolific breeder and highly tolerant of degraded water, is being used in a full-scale overland-flow system being studied at Paul's Valley, Okla., near Ada.

Bullrushes and cattails are being tested in a smaller overland-flow pilot-scale system conducted under a grant in Oshkosh, Wis.

The fish consume suspended solids while feeding and the bullrushes and cattails absorb organic materials.

The clams, fish, bullrushes and cattails are being tested to determine if they can handle the final "polishing" work in cleansing waste water, usually the most expensive process in treatment operations. □



*Eddie Lee is a public information officer at the Kerr Laboratory in Ada.*