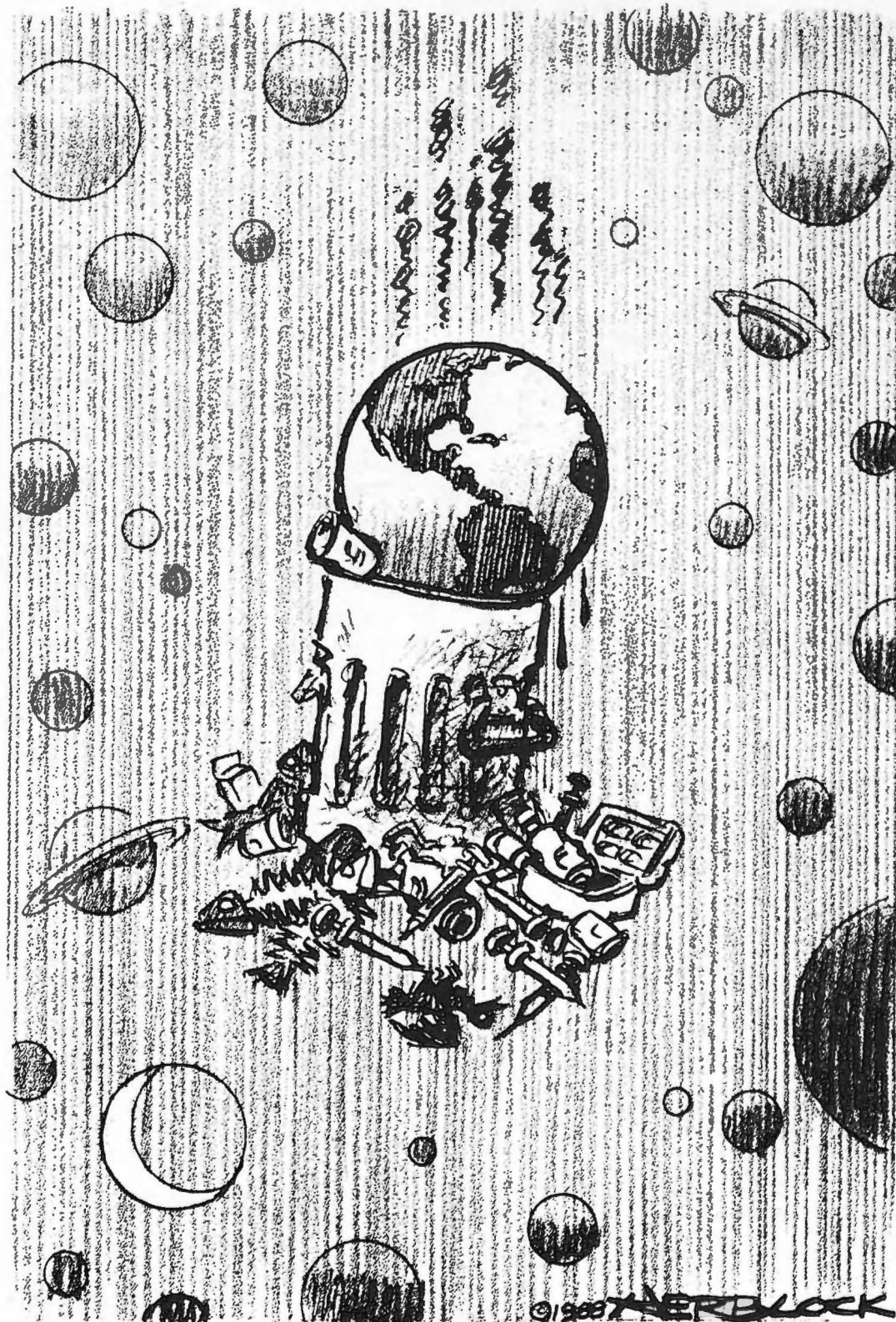


EPA JOURNAL

THE DISPOSABLE SOCIETY



Our Environmental Priorities: What Should They Be?

How can the nation establish and implement priorities for action out of what sometimes seems to be an overwhelming number of environmental problems? This issue of *EPA Journal* explores the question and also includes articles on related items such as a proposal for a world Earth Day in 1990 to establish environmental concerns as a global priority.

The first article discusses a basic concern: how well do our present institutional tools serve us in the setting and carrying out of environmental priorities? It is by Mike Gruber, an EPA staffer on a temporary assignment to the Washington State Department of Natural Resources and a long-time environmental writer.

In the second feature, six observers ranging from a leader of a national environmental group to a Western Governor explain what their approach to environmental priority-setting would be if they were advising the new Administration.

Next, the public speaks. In this feature, 17 people in different occupations in states from California to New Jersey say in interviews what they believe the country's environmental priorities ought to be.

Then Alvin Alm, a former EPA deputy administrator, explains the recommendations that a working committee he chairs

has made for research strategies to help solve urgent environmental problems of the next decade and beyond, whatever they may be. The report was requested by EPA's Administrator. Next an Agency writer, Jack Lewis, summarizes environmental progress and challenges generally, based on a recent EPA report.

An article by an Agency official, Jerry Kotas, explains a shift in EPA's priorities toward prevention of

pollution before it gets into the environment. And an article by another EPA staffer, Ron Brand, portrays an innovative approach to a typically complex, modern-day pollution control task, ensuring that the thousands of underground storage tanks around the country don't harm the environment and people's health.

Taking a global perspective, author Denis Hayes, who was coordinator

of the first Earth Day, proposes a similar event globally in 1990, two decades after the first observance on April 22, 1970. He argues that environmental priorities must now become a greater concern everywhere, backed by public understanding and will.

Next is a letter to the editor taking issue with an article in a recent *Journal*. The magazine then concludes with a regular feature, *Appointments*. □



Patrick Burns photo. The New York Times

Remember flower power? Celebrating nature and its riches on the first Earth Day (April 22, 1970), an estimated 25 million Americans took part in the largest organized demonstration in human history. See article on page 34 proposing a global Earth Day in 1990.

EPA JOURNAL

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EPA is charged by Congress to protect the nation's land, air, and water systems. Under a mandate of national environmental laws, the agency strives to formulate and implement actions which lead to a compatible balance between human activities and the ability of natural systems to support and nurture life.

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Are Today's Institutional Tools Up to the Task?

by Michael Gruber

Despite the substantial achievements scored in environmental protection in the United States over the past two decades, policy-making in this field generally takes place against a background of disappointment. There is a pervasive sense in the nation at large, and even within the ranks of EPA, that we should be doing better, that there is a continuing and even expanding gap between expectation and what EPA can deliver.

Certainly no other regulatory agency is in the news and before Congress so frequently or, by and large, through four administrations, so often pilloried in both places. It cannot be just politics or bureaucratic sloth that causes this. The problems are inherent. In other words, EPA is a creature of its laws, the state of science, and the public will, and its problems arise from the fact that these do not always pull it in the same direction.

First, the laws. EPA, arguably the most important federal regulatory agency, is also the only one without a comprehensive organic statute. No legislation tells its Administrator simply to protect the whole environment in the most effective way. Instead, EPA administers nine separate statutes and parts of four others. These different statutes have different kinds of goals and, in large measure, quite different intellectual antecedents. Some arise from the conservation ethic, the desire to protect the natural world. Some arise from a concern about human health. Others stem from observations of the ill effects of pollutants on economic or aesthetic values. Each statute has given rise to a virtually independent program, and each program has staked out an environmental problem that it is required to "fix" according to its particular statutory mandate.

Unfortunately, the real environment is not so neatly divided. All parts of the environment are in some way connected. It follows that the control of pollution should be integrated across program and disciplinary lines, so as to increase the efficiency of control from a whole-environment perspective and to prevent the unwanted transfer of pollutants from medium to medium.

There is a pervasive sense in the nation at large, and even within the ranks of EPA, that we should be doing better

This was one of the original reasons EPA was established in 1972, but the Agency's legal structure (and the administrative organization that arises from it) has made a cross-media approach nearly impossible. Pollutants "eliminated" from one environmental medium (such as the air) show up unexpectedly in another (such as water). The acid rain problem is one example of this effect.

This non-integration has deep roots in the Agency. EPA was formed by combining different organizations, which had not only different statutory mandates but also quite different professional values. Thus, even if we were able to institute a perfectly integrated program from a legal and organizational standpoint, even if the Agency were empowered to move more effectively than it now can, there would remain the problem of what to do in the face of varying degrees of scientific uncertainty.

In exercising its great powers over our national life, EPA is obliged to act according to the best available scientific knowledge, but scientific uncertainty is pervasive in environmental decision-making to an extent that is

difficult for the public to comprehend. We are hardly ever sure about how pollutants affect human health or environmental values, about the movement and transformation of pollutants after release, or about the actual distribution of pollutants in the environment.

EPA's efforts at dealing with this uncertainty have been hampered because different members of the environmental protection community typically display different attitudes about the level of understanding required before action takes place. For example, people trained in public health are predisposed to act "protectively"—that is, on the basis of a fair probability of harm, a bent that is specifically authorized in most of EPA's statutes. Also, many of these laws demand decisions for which no firm scientific basis exists. As a result, those in the scientific community who do not have this public health background may be uncomfortable with some part of what EPA does; this is one reason why scientific issues concerning environmental protection often wind up for resolution in the courtroom rather than the laboratory.





Wetlands such as this peaceful bayou in Louisiana often are doomed to be drained or filled for human activities. The author believes that protection of natural values should rank high on the scale of EPA concerns along with public health.

Steve Delaney

The lawyers tend to pull in the opposite direction. EPA is a legal as well as a scientific entity. Lawyers need enforceable standards that will hold up under court challenge. They tend to be impatient with scientific uncertainty and skeptical about control measures that depend on tentative conclusions or doubtful calculations.

Engineering solutions have often been used to get around such problems—in the sense that it becomes less important to know the precise effect of a pollutant on health if you are committed to removing that pollutant through application of the best available technology. Engineers tend to look narrowly at efficiency: i.e., is this the best way to remove this substance from a particular medium? Historically, they have been less concerned with calculating the effect of removal on some value, such as human health, or with intermedia transfers.

Economists (and public policy managers generally) are interested in comparing quantified values. They seek to connect the cost of a cleanup with some quantifiable benefit derived from it. But although simple sets of numbers (such as costs and risks) may be easy to compare, such comparisons often bury the uncertainties underlying them and may supply an impression of accuracy that is entirely illusory.

One result of this disparity of values is that when the Agency presents its decisions to the public, many people have a hard time distinguishing between what is science (pollutant X has YZ effect) and what is policy (all things considered, it is probably in the public interest to keep exposure to such a pollutant below a certain level).

Paradoxically, most Americans espouse a style of life that is, in fact, highly polluting.

This uncertainty makes the public uneasy, as does the appearance of environmental problems that were supposed to have been "fixed" but which, partly because of the Agency's piecemeal approach, have popped up again in another guise. This unease has resulted in an almost continual flood of mandates—both new laws and amendments to old ones—each one designed to patch a particular leak. This is a recipe for failure. At present, the simple fact is that the EPA cannot possibly do all the things its various mandates tell it to do. After a brief spurt of rapid growth in the early 1970s, the constant dollar budget of EPA has

changed only marginally in purchasing power. During the last three administrations it has hovered around \$1 billion, exclusive of sewage construction grants and the Superfund. If this size represents the effective national consensus on how large the federal environmental effort should be, then it is too small for the present mission. It is difficult to imagine a plausible political scenario that would make it large enough.

For example, EPA has been told to eliminate water pollution, eliminate all risk from air pollution, prevent hazardous waste from reaching ground water, establish standards for all toxic drinking water contaminants, and register and "reregister" all pesticides. None of these things has yet been accomplished. The scale and complexity of the problems involved are simply too large.

And even if EPA's resources were more suited to its mission, and even if it knew exactly how to accomplish this mission, it is not at all clear that the radical restructuring of American life that such a mission implies would be accepted. The American people are strong supporters of environmental protection. In virtually every national poll taken during the past 15 years, they have declared by substantial majorities that the environmental effort should be expanded, and that they are willing to make economic sacrifices to control pollution. The desire to control pollution is particularly strong where toxic substances are involved. We may surmise, in fact, on the evidence of innumerable public meetings, that the tolerance of the American public for risks from contamination by toxic substances is virtually nil.

Paradoxically, most Americans espouse a style of life that is, in fact,



Steve Delaney photo

highly polluting. They want cheap energy and a society based on automobile travel, with plenty of roads, parking lots, and shopping malls. They want plentiful, cheap, attractive foodstuffs. They want the convenience and economy afforded by a large and growing selection of chemical-based industrial and consumer products. They want to be able to throw things away.

What they don't want is a lot of federal government interference in their personal choices—where to live, what to build, what to drive, how to drive it, and so on. The failure of the noise program and of transportation planning to control pollution, the near-impossibility of siting hazardous waste facilities, and the difficulty we still have in controlling land use to protect wetlands are examples.

In going from the rhetoric of environmental law to the realities of environmental protection, EPA is forced to make innumerable compromises. It has no clear guide on how to make these compromises. The laws and public opinion tend to cast the Agency as an uncompromising environmental advocate; the facts of economic life and the realities of operations on the state and local levels demand the brokering of different interests. The Agency often finds itself in the position of being wrong whatever it does. This situation does not encourage boldness and alacrity in those subject to it.

Today it seems that the natural world—the planetary ecology—is less in danger from high technology than from low.

Thus the general problem confronting EPA: a patchwork legal structure, an unsure scientific base, and an impatient public that is nonetheless ambivalent about the true lifestyle costs of a pollution-free society. This problem is not going to go away anytime soon, but as a first step in dealing with it straightforwardly the Agency might adopt the following three principles. These principles—and the policy changes that flow naturally from them—could become the basis for a more effective and efficient environmental policy for the United States, a policy that would be flexible enough to cope with the future.

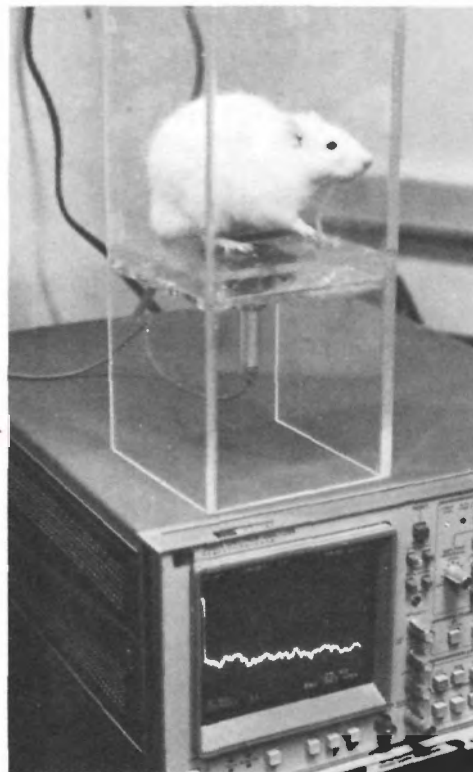
- *Environmental protection policy must recognize the interconnectedness of the environment and emphasize multi-media approaches to pollution control.*

This means that when we require that pollution be removed from one environmental medium, we are obliged to determine where it goes and what it

does when it gets there, in quantitative risk terms, whenever possible. Naturally, the stability and rationality of the Agency's operations would be greatly enhanced if it had only one statute to administer and a smaller set of Congressional committees to deal with. The friends of the environment might do well to encourage Congress to move in this direction.

Meanwhile, integration is easier to talk about than to do. Currently, efforts at integration within EPA have to swim against the stream of single-media program rules and legislation. An integrated approach, for example, requires a quite different sort of information than does a set of quasi-independent media-specific programs. Yet it is the programs that do the bulk of the information-collecting. Information-collection budgets being always tight, these programs are resistant to collecting information not specifically required by program needs. For this reason, retrospective integration, which reviews a program decision for cross-media impact prior to a regulatory decision, is clumsy and inefficient: there may be enough information to stir suspicions that, for example, risk is being transferred across media lines, but usually not enough to

Americans generally espouse a lifestyle that is highly polluting. Among other things, they want plentiful, cheap, cosmetically attractive food products that depend on the use of chemicals in agricultural production.



Environmental protection efforts frequently involve scientific uncertainty, which is inherent even in the most sophisticated risk assessment. The public prefers certainty.

propose an alternate policy. Risk-based cross-media analysis must become prospective, and the programs must be given a positive responsibility to generate the information that will make this a reality.

- We must accept that the main business of environmental protection is the reduction of risk.

The EPA should therefore endeavor to understand (in quantitative terms, where possible) the risk-reduction consequences of every individual action as well as those of all our actions taken together. "Risk" should be broadly defined. It means human health risk in the literal sense, of course, but it must be extended to include damage of all types, to all organisms, to natural systems, and to other environmental values. We must re-emphasize that while EPA is a public health agency, it is not just a public health agency. The preservation of ecological values may not make headlines, but if EPA is not strong in this area, no one else will be, and we will all suffer for it in the long run.

While it is perhaps impossible to find a common metric that will tie all these values together, it is quite possible to communicate the sum of what we have accomplished in terms of the various "risks" we have reduced, and to justify the balance among risks of various types within this sum.

The familiar uncertainties associated with risk calculations ought not to prevent EPA from adopting a strategic approach based on risk-reduction in all of its programs. A true strategic approach means the concentration of resources on a few obtainable, measurable objectives. Given the inevitable limitation of resources, it carries with it the implication that less important objectives will not be completely carried out. It also implies the transfer of personnel and budget

It is difficult to see how significant progress can be made by a continuation, or even a substantial expansion, of business-as-usual.

between programs and the creation of a much more flexible agency than has existed in the past. EPA will have to defend these choices on the basis of risk calculations, or at least some explicit comparative statements about the extent to which various options prevent damage to environmental values. This in itself would be a major change and extremely valuable as a means of communicating with the public and Congress.

To support this risk-based effort, the EPA could replace or at least supplement its traditional measures of achievement with measures based on risk. Although a count of permits issued and site cleanups started, for example, is a useful indicator of administrative progress, it is essential to get a better grasp of what these programmatic indicators mean in terms of substantial environmental benefits. EPA's accountability system could be modified to hold program managers responsible for developing measures to reflect real environmental objectives and for progress in achieving them. A stronger focus on avoiding the inter-media

transfer of pollutants is a necessary part of such an approach, since its goal is to reduce, rather than transfer, risk.

Changing policy emphasis from "pollution control" to "reduction of risk" (where "risk" includes measurable environmental damage) requires new forms of regulation. It is important to recognize that technology-based, command-and-control regulation is less valuable in dealing with the final increments of pollution and with toxics than it was in managing the gross pollution for which it was first designed. The reason is not just that command-and-control is often overly expensive for the benefit achieved, and difficult to implement. The scale of the problem—the number of pollutants, the number of diverse sources, and so on—militates against a purely command-and-control system having a substantial effect on the problem except in the very longest run.

The alternative is to adopt policies that will turn the interests of polluters against polluting. Incentives based on risk reduction, supported by a really comprehensive and reliable monitoring system, are worth trying on a significant scale. States have used fee systems for hazardous waste disposal, for example, and constructed them so as to favor the safest forms of disposal and to penalize the production of particularly hazardous wastes.

It will be argued that alternatives to command-and-control allow cheating. Of course some cheating will occur. But the essential question is how to reduce the damage done by pollution in the shortest time, with something like the present level of enforcement resources. What we are doing now is not working at all well. The system is marked by substantial non-compliance, delay, consent decrees, and the other apparatus of legalistic combat, rather than by a steady reduction in toxic

exposure. It seems reasonable that the same forces that operate in the marketplace should be given more of a chance to operate to limit pollution than they have in the past.

The most difficult aspect of the EPA's mission is that it is expected to be simultaneously the national advocate for a better environment and the agent responsible for balancing environmental goals against other social values.

Credibility is the key to accomplishing this mission. If the Agency is seen as bold and swift in the location and reduction of substantial risks, it is likely to be granted the leeway it needs to perform the appropriate balancing judgments, even when this requires declining to control certain minor risks.

The success of this approach will depend on its demonstrated superiority in actually reducing palpable excessive risk (as opposed to issuing regulations designed to "control" this or that type of pollution). It will be difficult to do this if environmental policy continues its traditional reliance on command-and-control regulation, since EPA and the states will never have the resources actually to enforce every such regulation on every source.

Environmental policy must begin to move toward an incentive/penalty approach based on severity of the risk generated by polluters.

- *The relation between the federal environmental effort and those of the various states must be redefined.*

Where risks affect local populations, remedial solutions should be tailored to fit the local situation, and state and local governments should play a major role in doing this. A credible approach of this type requires three things:

— It must be well-understood that pollution havens will not be allowed.

— The federal authority must be vigorously applied if it appears that a locality is suffering from pollution produced in another locality.

— The technical resources of EPA must be to some extent re-focused to support locally designed risk reduction.

The relationship of the federal environmental effort to those of the states must therefore be redefined.

EPA's media programs spend an inordinate amount of time checking up on what state programs have done, and approving changes in those programs. Such policies arise from the need to check that federal resources are being properly spent, which is reasonable, and from the program oversight functions built into the statutes. These statutory oversight provisions are based largely

The EPA should re-focus its resources, and concentrate on the big problems again, both those that remain in the United States, and those of the global community.

on the continuing suspicion that, left to themselves, some states will become pollution havens. Although states vary in their enthusiasm for environmental protection, there is no evidence that this has ever translated into differential choices on the part of firms. This is a large and diverse country, and flexibility in implementing programs seems an obvious necessity.

Elaborate second-guessing of states uses resources that might better be spent doing things that the states can not do at all—controlling interstate movement of pollution, for example. States also have a limited ability to perform intensive and costly monitoring in areas particularly susceptible to environmental risk, and EPA could help here as well. In general, EPA could increase its ability to supply state governments with the information base for effective and efficient control of particular local pollution problems.

Can such changes really occur? Perhaps not, and certainly not all at once. But it is difficult to see how significant progress can be made by a continuation, or even a substantial expansion, of business-as-usual. Over the past five years, policy-making at EPA has been dominated by the struggle to control relatively small increments in the incidence of a single human disease: cancer. Cancer tends to dominate environmental debate now, not only because it is dreaded and widespread but because a technical peculiarity of risk assessment, the inability to set a threshold (i.e., an exposure level at which there is zero risk) for many carcinogens, ensures that when some exposure is found, some risk can be calculated. This calculated risk then galvanizes a public outcry and thereafter the policy-making process.

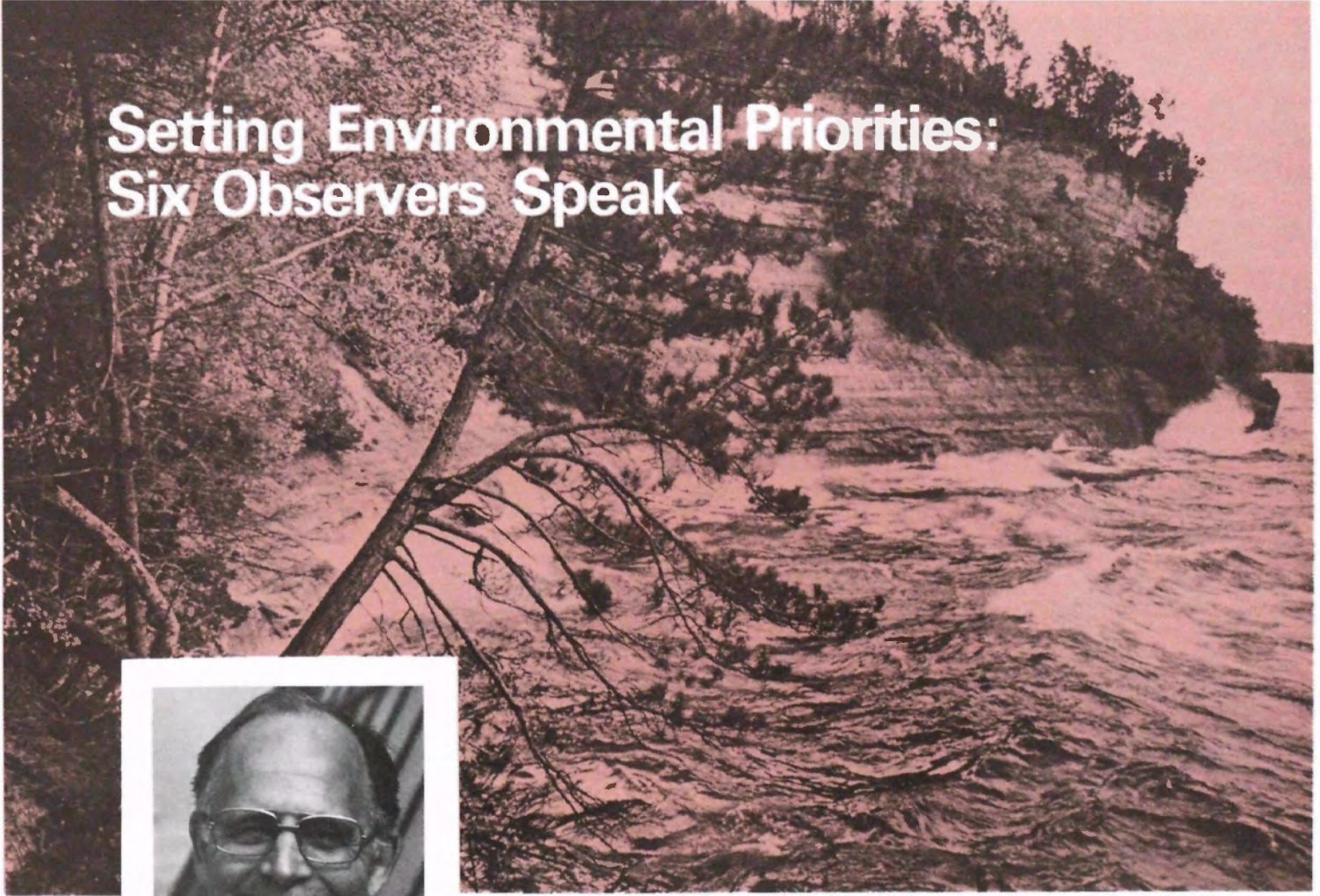
This is a long way from the original ideal of the environmental movement, which was nothing less than to bring technological society into harmony with the natural world. Today it seems that the natural world—the planetary ecology—is less in danger from high technology than from low. Half the world's people still have firewood as their only fuel. In some places this dependence has disastrous consequences for local ecosystems. Economic development in many countries proceeds in a manner that is wholly oblivious to environmental effects. In the Amazon, an area of rain forest the size of Austria is destroyed each year. This destruction may have global consequences.

It appears that we may experience planetary warming in the next few decades due to the production of greenhouse gases by technological civilization. Major changes in this civilization may be necessary to keep this trend from developing into widespread catastrophe.

On the health front, we might wonder why we are willing to spend millions of dollars to (perhaps) avoid a fraction of a case of cancer each year, when each day about 25,000 people throughout the world die of easily preventable water-borne diseases or from the effects of insufficient water. Obviously, we do not yet know how to deal with global problems. But, just as obviously, 20 years ago we did not know how to deal with national problems, and we have dealt successfully with many of them. In the EPA the nation forged an instrument that was able to confront national pollution problems of staggering complexity and to avert what many saw as inevitable disaster. The EPA should re-focus its resources, and concentrate on the big problems again, both those that remain in the United States, and those of the global community. □

(Gruber is an EPA staffer on temporary assignment to the Department of Natural Resources in the State of Washington under an Intergovernmental Personnel Act program. He is a long-time environmental observer and writer.)

Setting Environmental Priorities: Six Observers Speak



Richard Frear photo, National Park Service



John H. Gibbons



Peter A. A. Berle



Bruce W. Karrh



Roy Romer



Milton Russell



Raymond C. Loehr

Environmental concerns ranging from global warming to medical waste disposal to poor air quality in major cities have caught the news headlines repeatedly in recent months. Many of these same concerns were also reflected in the campaigns of both Presidential candidates. What should be the top environmental priorities for the new Administration and Congress, and how should our decision-makers go about setting these priorities? EPA Journal asked six prominent observers in the environmental arena for their opinions. Their comments follow:

A Congressional Advisor

by John H. Gibbons

Planting alternating strips of corn and small grains protects this Maryland farm from erosion. Such steps can help safeguard water quality.

The specter of global warming heightens our awareness of environmental problems long brewing—acid rain, urban and regional air pollution, species extinction, water degradation, human dislocation—and highlights their international characteristics. Relations between Canada and the United States suffer from acid rain; Brazil must deal with conflicts between national development and preservation of tropical forests critical to the globe's health; carbon dioxide, methane, chlorofluorocarbons, and other molecules that threaten climate and the protective

encourage them. Overall, our environmental policies reveal a commitment to clean up the messes we make, but also inadequate reflection upon ways to avoid those messes in the first place.

A top priority for the nation is an environmental policy reorientation toward programs that emphasize resource efficiency as well as improved pollution prevention and control, and that consider the global commons as well as local problems. A drive to slow the

flow of energy and mineral resources required to produce a given level of goods and services would commensurately reduce pollution, even in the absence of more stringent clean-up requirements. Such a comprehensive approach to policy requires coordination of the many federal and state agencies that play roles in national environmental policy. Congress could designate a major role for EPA in such a policy revision.

EPA traditionally plays the part of regulatory taskmaster of emissions limits and pollution cleanup. But recent developments indicate that it may be timely and appropriate for the Agency to assume a larger role in protecting the national and global environment. Global warming presents extraordinarily complex issues of science and international relations that require immediate national attention. Warming, which results largely from burning fossil fuels, can be slowed or halted, though it may be essentially irreversible. More tractable problems, such as air pollution and acid rain, are also closely linked to fuel consumption. Many national security costs are attributable to energy appetites. Work on any of these problems is inherently linked to the others. A resource-efficiency approach to global warming—particularly adoption of energy conservation policies—could further the economic, environmental, and national security agendas of many agencies in this nation and many countries around the world. Given adequate funding and authority, EPA could more effectively coordinate domestic policy and work more aggressively with other agencies, like the Department of State and Department of Energy (DOE), to lead efforts toward international accords.

It may be timely and appropriate for the Agency to assume a larger role in protecting the national and global environment.

ozone layer do their work regardless of where they come from or who they affect.

These seemingly disparate issues share a similar root: inefficient use of resources. Many pollution problems are directly linked to inefficient use of fossil fuels, yet U.S. policy sends mixed signals on implementation of energy conservation methods that have proven cost-effective. Similarly, some companies have shown that investment in resource-efficient processes that result in hazardous waste reduction can be profitable, but few companies have followed their lead, and national policy does little to



More cars and more auto travel have meant more fuel use, which, in turn, has produced more air pollution. This heavy traffic is approaching the Oakland, California, Bay Bridge toll plaza.



Tim McCabe photo USDA

An intensified role in global issues will still leave EPA with a plateful of serious pollution issues at regional and local levels within the United States. Tropospheric ozone, acid rain, and indoor air quality hazards must be addressed within the framework of a revised Clean Air Act. Aquatic resources—marine and freshwater environments, ground water, wetlands—suffer from a variety of pollutants (farm and street run-off, industrial and municipal discharges, dumping, atmospheric deposition) that must be curbed. Decisions and action are required with respect to hazardous and municipal solid waste, particularly to encourage the prevention of waste generation at its source.

Using technology to improve resource efficiency can help solve many of these problems. Urban and regional air pollution results mainly from fuel use; thus EPA's enforcement of the emissions limits required by the Clean Air Act would be much

simpler if less energy were consumed. The goal of clean air could best be reached, then, by coordination of EPA's activities with those of the Department of Transportation, which enforces fuel economy standards, and DOE, which enforces appliance efficiency standards and could encourage energy conservation in all economic sectors. In another medium, EPA's efforts to enforce the Clean Water Act, which are beginning to reduce point-source pollution, could be enhanced in the area of nonpoint sources by actions from other agencies. For instance, the U.S. Department of Agriculture could greatly assist efforts to control nonpoint-source pollution by implementing agricultural policies that discourage excessive fertilizer and pesticide use and by continuing to develop innovative approaches to farm waste management. A clean and productive natural environment requires policies that go beyond cleanup and focus on pollution prevention

and resource efficiency. EPA could be a key player in structuring such an approach.

Policy priorities derive most logically from the magnitude of a problem's impact or risk of impact. Environmental problems are increasingly global—either in origin (as with global warming, loss of stratospheric ozone, rapid population growth)—or in similarity of impact (as with air pollution, toxic and hazardous wastes, and military- or civilian-produced nuclear waste). The necessity of local and national cleanup has demanded most of our attention to date. But a future that includes continued economic growth for us and Third World development requires that we also begin to focus on ways to prevent pollution and enhance waste reduction. In other words, it requires that we make wise and thoughtful use of our resources.

Adoption of resource efficiency as a major stratagem for achieving a healthy environment will require a strong leader. The

stated goals of existing legislation create an unspoken but critical role for EPA to help devise an integrated approach to environmental problems. We should also consider a new environmental mandate that specifically recognizes the interconnectedness of all human activities and includes authority for EPA to:

- Help coordinate environmental actions of domestic agencies.
- Participate more actively in international affairs.
- Expend funds not only to enforce existing programs but also to research new and better approaches to waste reduction and resource efficiency.

These directives could effectively replace the piecemeal and sometimes illusory "progress" of the past. □

(Gibbons is Director of the Congressional Office of Technology Assessment.)

An Environmental Leader

by Peter A. A. Berle

For the first time in history, unprecedented numbers of people are consuming the earth's resources in ways and at a rate that cannot be sustained. In light of this collision course of consumption and resources, there are two overriding and intertwined issues that the next Administration and Congress must tackle if the United States is to reassert its world leadership role and make significant progress toward protecting and improving environmental quality of life. These key issues are:

- **Energy.** We must make dramatic gains in energy conservation, energy efficiency, development of alternative renewable energy sources, and recycling.
- **Population.** We need to drastically increase support

to developing nations for family planning education and distribution of contraceptives. In addition, we must support intensive research aimed at fostering a technological leap in safe and simple contraceptives. We as a nation must chart this bold course not only because it will bring us into greater harmony with our natural environment and it makes sense economically, but because our national security is at stake.

Since the end of World War II, we in the industrialized world have viewed national security and international stability largely as a bipolar, East-versus-West struggle played out primarily in terms of military strength. That school of thought persists to this day. However, the stark reality is that virtually anywhere we might

look in the world—from the population crush in Mexico and Egypt to the deforestation of Indonesia and Central America—nations of strategic importance are suffering from environmental and population problems that have frightful potential to destabilize their governments and their regions. This tends to be seen as a threat only to Third World stability. But now that global warming is part of this equation, we must confront the possibility of major economic disruption to the United States and other industrial nations.

This is why addressing the energy issue must be a high priority early in the next Administration. Continuing to rely heavily on non-renewable fossil fuels, with no long-term plan to cut back our burning of oil and

coal, clearly puts us at risk both to the vagaries of Middle Eastern politics and to the greenhouse effect.

Economic competitiveness also comes into play here. For example, our per capita energy consumption is twice that of West Germany's.

The moral issue of practicing what we preach is also an important factor here that will greatly affect our ability to influence both the First and Third Worlds. This is best illustrated by the fact that the United States, with just 5 percent of the world's population, consumes 33 percent of the world's resources and creates 33 percent of the world's pollution.

Clearly, to be effective as a world leader on conservation and environment issues, we must be sure that the United States is not asking the



AID photo

people of the industrialized world or the Third World to do something that people in New Mexico or New York or California won't do. Thus the next President faces both a moral and economic imperative to take steps that will significantly decrease energy consumption in the United States.

The place to start is with auto fuel efficiency standards, for here we can, in the near term, take concrete action that will reduce dependence on imported oil, protect ecologically sensitive lands, and begin to reduce emission of pollutants into the atmosphere. Even a gas mileage increase of 1.7 mile per gallon over the current standard, for example, would save as much oil as may be found in the Arctic National Wildlife Refuge.

But of course we need to improve fuel economy far more than that. The technology exists to begin production in the near future of comfortable subcompact cars that get 70 miles per gallon. Senator Timothy Wirth has introduced legislation that would require new car fleets to average 55 miles per gallon by the year 2010. While available technology will allow us to do much better than that, Senator Wirth's bill is a good starting point for discussion.

Hand in hand with auto efficiency must come tougher mandatory energy efficiency standards for appliances and lighting. Significant strides



Population is straining the world's resources. In some countries, spiraling population is outreaching even basic necessities. In others, per capita consumption soars due to affluence.

were made with the appliance efficiency legislation enacted in 1987, but in this area, too, the technology already exists to make major improvements.

Another major component of a national drive toward energy efficiency and away from fossil fuel consumption must be to revitalize the U.S. effort to develop alternative renewable sources of energy. While this will mean a renewed federal commitment to support research and development of things like solar and wind power, states can also have a big impact. California, for example, has for years successfully promoted alternative energy development through its progressive regulation of electric and gas utility companies. This is something that we at National Audubon are urging grassroots environmental activists to focus on.

The next President and Congress also need to institute a national public education program aimed at persuading average citizens that changes in personal lifestyle are necessary for the common good. Such changes

include better insulating our homes, driving less and using public transport more, and turning thermostats down in the winter and up in the summer.

Coupled with such conservation measures, recycling could allow our nation to simultaneously reduce energy consumption, save forests, and attack the crises gripping many states over garbage disposal and incineration. The next Administration and Congress must speed the drive toward recycling at all levels.

Even more so than conservation and recycling proposals, population control and family planning are obviously issues that touch directly on cultural and lifestyle questions. When we speak of reasserting America's global leadership, in no other area is the need as great. For virtually every environmental problem has a direct or indirect relationship to population pressures. In fact, it would be difficult to identify a single

environmental problem that would not be in some way reduced or made less severe if population growth were curbed.

Therefore re-establishing the world leadership role America once held in family planning is crucial. This leadership will mean, among other things, providing far more support to developing nations for family planning education and for distribution of contraceptives.

In addition, Congress and the next Administration need to provide sufficient research funds for accelerated development of 100-percent safe and simple contraceptives for men and women. The objective should be a technological leap over existing contraceptives in terms of safety, ease of use, and reliability.

The inexorable twin problems of population and energy pressures, considered together with growing concerns over global warming and the enormous national security implications of our energy policies, mean that our new leaders will have a tremendous responsibility in the years ahead. We as U.S. citizens must insist that our leaders meet this challenge; otherwise, as citizens of the globe, we may well fail in our duty as stewards of the earth's environmental health and vitality—both for human generations yet unborn and for all other animal and plant species that share this planet with us. □

(Berle is President of the National Audubon Society.)

Drought and constant trimming for firewood limit tree growth in the Sahel in Africa. A conservation ethic would be conscious both of the planet's available resources and the pressure on them from people.

An Industry Official

by Bruce W. Karrh

After 20 years of intense environmentalism in the United States, I'm struck by a common perception of little or no progress. A decade ago, *Time* ran as its cover story, "The Poisoning of America"; a month ago, ABC broadcast a TV news special, "The Poisoning of America."

If anything, the sense of malaise and crisis has deepened over two decades. The environment has proved to be a moving target, from silent spring to snail darter to

There must be a better way. Some things are riskier than others, and it's important to know which.

Superfund to global warming. Expectations continue to rise, but each control measure is seen not to be the answer but to pose more questions. This is true for air quality, surface and ground water, hazardous wastes, land disposal, or toxic substances.

The latest environmental outcry has apocalyptic overtones. The earth is warming, polar ice caps may melt, seas will rise and inundate coastal cities, and fertile plains could become barren deserts. With such alarm bells sounding, it is difficult to sort through the scientific evidence to see what is happening and why. How much of last summer's extreme weather can be attributed to the buildup of

"greenhouse" gases? Are we reading long-term implications into short-term cyclical changes? We've done this before. Remember the cold spell a few years ago, and warnings of the coming ice age.

Could the outcry be an instance of our need and desire to be stimulated, even by fear? As individuals and as a society, we thrive in tension and seek challenges and excitement. Witness the popularity of Stephen King and of "horror" movies and fiction in general. From the beginning of time, some men and women have cried wolf. Angry prophets people the Old Testament, and Cassandra of Greek mythology has given her name to prophets of disaster.

Sometimes they're right. There have been recent examples of early warnings that turned out to be correct. Asbestos and stratospheric ozone come to mind. The fact is that the consequences of a real greenhouse effect could be catastrophic. Yet I detect other forces at work here: fears of population growth and resource depletion that go back at least to Malthus, and a bias against progress and industrial activity that is of more recent origins.

What we can conclude with certainty is that the hot summer of 1988 helped create a public and political climate conducive to rhetoric and perhaps to actions that may be potentially useful or simply wasteful. Setting priorities becomes most timely, and I have listed four. They deal not with areas of technical concern but with the social process of addressing environmental issues, for that is where the problems lie.



Reynolds Aluminum Recycling Company photo

• *First, we need a better way to reach informed judgments about risk and to communicate these judgments. This need was highlighted in 1983 by William G. Simeral, then an executive vice president of Du Pont and chairman of the Chemical Manufacturers Association. Others have identified the same need, yet today people, their elected representatives, regulators, and regulated industries are buffeted still by waves of alarm and apathy. As a body politic, we seem to be either wringing our hands or sitting on them. The recent television program, "The Poisoning of America," was such a cacophony of ills and catalog of villains that the viewer could only throw up his hands in despair and confusion.*

There must be a better way. Some things are riskier than others, and it's important to know which. We must take into account such "outrage" factors as voluntarism, catastrophic potential, and the like, but we should insist on the distinction between what harms and what offends. Society may choose to remedy the offensive and ignore the harmful, but the electorate and elected

officials in particular should understand and acknowledge the difference. We must also overcome the ideological bias against "man made" versus natural. Mankind is part of nature and our handiwork is "natural" as a spider's web or beaver's dam.

• *Second, priority setting must receive more attention as an ongoing process. A clearer perception and consensus about risk should help in this task, but they won't do the whole job. They must be coupled with a realistic sense of our resources and of the true and total cost of environmental protection and cleanup. Our wealth is not infinite. It is not even as great as it used to be, having been drawn down by increased oil costs and international business competition, and there are many demands on it: infrastructure, debt service, defense, education, retirement, and other social programs, to name a few.*

Shredded aluminum cans arrive by rail at a reclamation plant. They are unloaded, then fed into a melting furnace.

Thousands of Americans collect aluminum cans daily for cash. Many unretrieved cans litter the rivers, cities, and countryside.

The goal of priority setting should be to use our resources wisely. We cannot do everything, and certainly we can't do everything at once. We should get at the real sources of pollution, not at those that are administratively easy or politically safe to tackle. The total bill should be tallied, including federal money, state and local funds, off-budget expenses of regulatory compliance, and (if they can be calculated) opportunity costs. We should look at environmental problems across the spectrum of air, land, and water; and worldwide.

- Third, for industry, environmental performance must be viewed as part of an overall economic or industrial policy. Industrial activity has a major impact on the environment, and if that is the sole basis by which companies are judged and regulated, their

contribution to the public welfare will not be perceived or nurtured. Current costs of environmental compliance are high, and laws already on

The goal of priority setting should be to use our resources wisely. We cannot do everything, and certainly we can't do everything at once.

the books mandate billions more in costs in the years ahead.

Some things should cost more—energy, for example—at the point of consumption. This would encourage conservation, which is one of our most potent environmental management tools. We should work toward the day when all product prices will reflect the

full cost of environmentally acceptable disposal at the end of the line.

Looking at environmental regulation in an economic context could lead to greater reliance on market mechanisms versus law enforcement models for compliance as well. This would be more efficient than the present system, which tends to punish law-abiding companies for paperwork violations while letting miscreants go undetected because it is impossible or expensive to catch them.

- Fourth, for individuals, the priority should be on paying the environmental bill and changing their behavior. Market mechanisms work for consumers as well as businesses, and full cost-accounting in the form of product prices, fees, or taxes could influence habits. Residential garbage fees based on the volume and type of garbage would affect

the number of cans at curbside and what's in them. We need to remember that time and convenience have value, and price them accordingly. Government can facilitate this process through education and incentives.

If this sounds like a reference to the hearts and minds of men, that is intentional. Over 10 years ago, President Jimmy Carter asked us to treat the energy crisis as the "moral equivalent of war." We added some insulation, bought a wood stove, gave up driving for a couple of Sundays, and voted him out of office. Without passing judgment on the Carter Administration, let me say I think he was onto something about moral equivalencies. There is an element of crusade to the ecological opportunity before us.

I use the word "ecology" deliberately. It involves more than environmentalism. Ecology is defined by Webster as "the relationship and adjustment of human groups to their geographical environment." That's what priorities are all about. We're going to have to choose our relationship and adjustment to our geographical environment. We could scarcely do better than to embrace as our first priority Teddy Roosevelt's objective when he said, "The nation behaves well if it treats natural resources as assets which it must turn over to the next generation increased and not impaired in value." It's not a new idea, but it is becoming more apparent and, it seems to me, more urgent. □

(Karrh is Vice President for Safety, Health, and Environmental Affairs at The Du Pont Company.)



Reynolds Aluminum Recycling Company photo

An Elected Official

by Governor Roy Romer

The man who becomes President next January will set this nation's environmental priorities into the next century. That is a daunting task. America in the 21st Century will face serious environmental challenges, and the Dukakis or the Bush Administration will determine how we begin to meet them.

I have strong opinions about what our priorities must be. But my main recommendation to the new Administration is that the setting of national priorities must be an inclusive process, reflecting the diverse concerns and needs of a diverse nation. Federal policy must give a voice to all regions of this nation.

This is especially important to Westerners, who have seldom felt federal policy reflects their concerns. In the West, we enjoy many

of this nation's last and greatest natural assets. We are proud of them. We are enriched by them. They are a part of us, and we define ourselves by them. To us, the environment is a quality-of-life issue.

This relationship to our environment is the basis of strong and often competing Western ethics. We must use our resources because our economy depends on them. But we also want and must preserve our beauty. We struggle for a meaningful blend of use and preservation.

Westerners hold no single philosophy on the environment. We seek neither benign neglect nor federal tutelage. What we seek is a pragmatic partnership with the federal government.

So my first message is that national priorities must

reflect the diverse values of the people and the regions of this country. In the West, that means policies which accommodate both use and

We seek neither benign neglect nor federal tutelage. What we seek is a pragmatic partnership with the federal government.

preservation—policies that help us reach a pragmatic blend of competing interests.

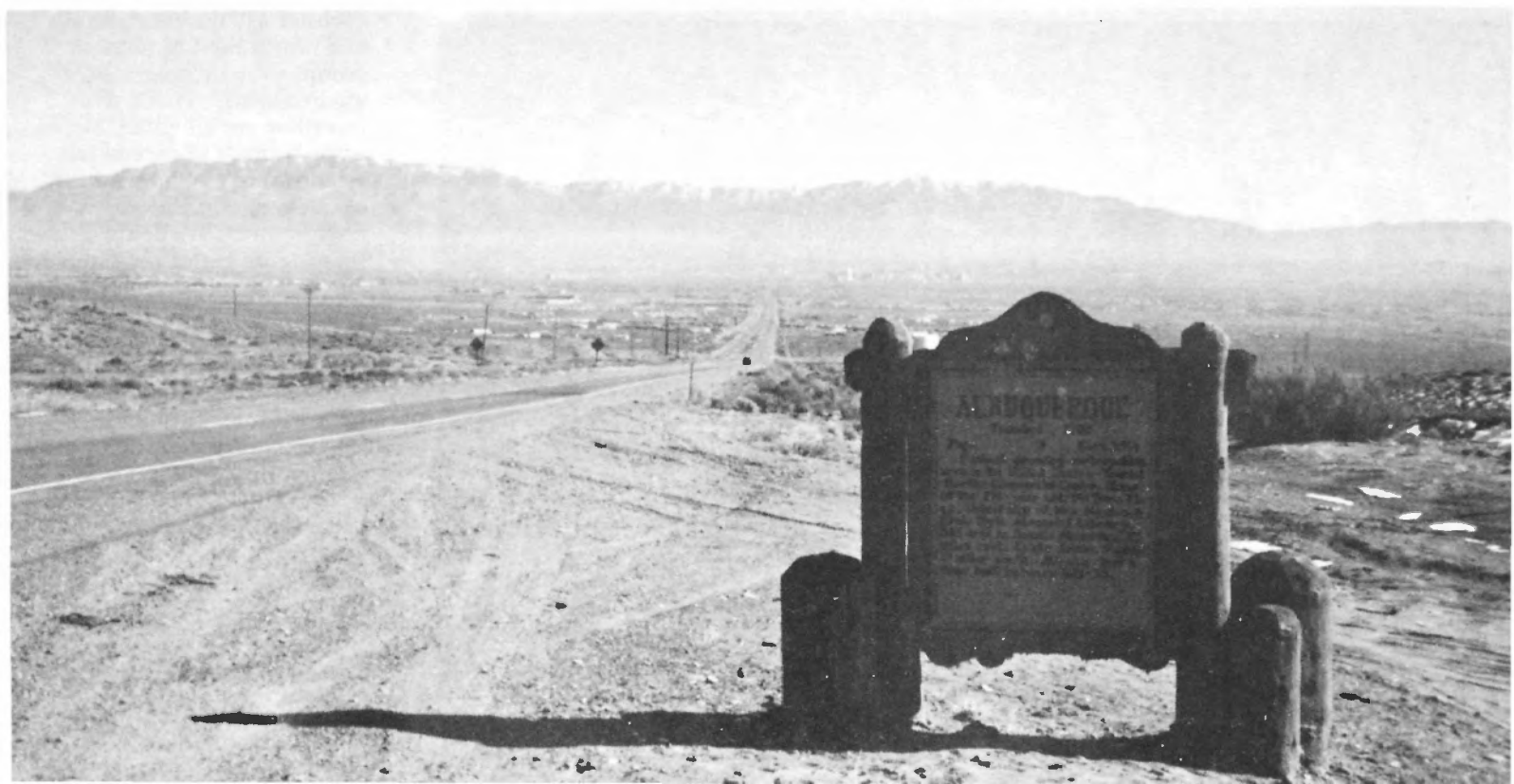
In water management, air and water quality, waste management, and other issues, federal policy must be responsive to Western values. The challenge for federal decision-makers must be to better understand the West.

In the past, the federal government was a partner in funding water projects for our cities and farms. A decade ago it abandoned this role in favor of a role as regulator, and the age of large Western water projects seemed to end.

Westerners disagree over whether this is good or bad. But most worry that federal regulators may lack an understanding of the arid West and what water means to places where only a few inches of rain fall each year.

If federal decision-makers are to be more involved in Western water, they must understand Western water issues. They must encourage adequate water storage and infrastructure for growing populations. They also must encourage water conservation and protect wildlife and recreation, which are essential to our economy and

Southwest Resource Center for Science and Engineering photo, University of New Mexico



lifestyle. It is not a simple conflict between growth and preservation, because we need both.

We also need federal help with air quality. Federal deadlines are useful because they pressure us to take action to improve the air. But they mean nothing if we are not given the tools to succeed.

Growth, altitude, meteorology, and a heavy reliance on automobiles conspire to harm the air of some Western cities. In fact, 11 of the nation's 13 carbon monoxide non-attainment areas are in the West.

At the same time, the West is on the cutting edge of air quality solutions. Colorado was the first to require oxygenated motor fuels to reduce carbon monoxide. Arizona and Albuquerque, New Mexico, now have similar requirements, and even New York City is examining our program. We also are proud of our Better Air Campaign, a voluntary program which reduces driving by up to 10 percent during our pollution season. These measures and others, including emissions inspections and burning restrictions, have greatly improved Colorado's air.



Dan Madden photo, University of Colorado Media Relations office

Federal deadlines are useful because they pressure us to take action to improve the air. But they mean nothing if we are not given the tools to succeed.

But we cannot do it alone. We need a federal partner who recognizes our problems and who will help us clean our air.

The clean air amendment bill which Congress considered this session would have virtually ignored the West. Despite work by some Western legislators, the bill appeared likely to focus

on Eastern ozone and ignore Western carbon monoxide. In the probable event that this Congress does not enact a clean air bill, work on such legislation will undoubtedly begin early next year. The new Administration should be a partner with Western states in helping Congress focus on our air quality needs, such as cold-start certification and high-altitude testing.

The West also can learn from the East on waste management. News of illegal ocean dumping and the infamous garbage barge highlight the need for foresight and innovation in solid and hazardous waste management. The federal government must continue to encourage all states to pursue innovative alternatives to landfills, including recycling, source reduction, and, where appropriate, incineration. State and federal officials also need to work with

The Western U.S. enjoys many of the country's greatest assets, presenting a challenge to balance protection of scenic beauty with resource use. Here, Frederick Zimmer practices ski turns on a Colorado slope.

industries which produce toxic byproducts on ways to reduce the use of traditional land-disposal methods.

Finally, I am convinced the next century will see great global environmental strain. We must meet the challenge now. Colorado has begun the Environment 2000 process to plan for its environmental needs into the next century. This two-year process will involve all interested Coloradans in discussions and plans for the future. EPA is a full partner in this project—the kind of partner the federal government must be in other areas if we are to meet the challenge.

Establishing partnerships and understanding this nation's diversity will be the keys to environmental progress under the new Administration. The West needs a partnership with the federal government consistent with Western issues and Western values. The West is ready. The next Administration must be ready too. □

(Romer is Governor of Colorado.)

Albuquerque, New Mexico, is enveloped in haze on a stagnant winter morning. Like some other high-altitude cities in the West, Albuquerque is undertaking measures to reduce carbon monoxide.

A Public Policy Specialist

by Milton Russell

The traffic controllers for environment and natural resource issues will have a radar screen full of blips as the 101st Congress and a new Administration come to Washington in 1989. When their watch starts, the new crew will have to decide some basic questions. Which blips need only an occasional glance to see that they are staying on course? Which require careful scrutiny to make sure the turns underway are really carried through, and are they the right turns? And which ones will demand intense attention because it is not clear how they should move to avoid future collisions?

Most of the established programs at EPA will need only that occasional glance so long as budgets are adequate to meet the needs, and management systems are in place to assure continued performance. EPA has done well on both counts over the past few years; maintaining progress and avoiding complacency are the tasks here.

On the other hand, new directions have been set in drinking water protection, pesticide regulation, reduction of CFCs, municipal waste water treatment, underground storage tanks, waste minimization, Superfund and RCRA implementation, and the community's right to know about hazardous substances, among others. Courses are set, but the people charged with doing the tough, slogging work of putting these changes in place will need support and their work will need attention.

New approaches to getting environmental results have also come to the fore. One example is focusing on risk reduction opportunities as a priority-setting device. Another is paying attention to cross-media transfers of

There will be four big categories on the score card used in the future to judge those coming on duty in 1989.

risk and, in general, taking an integrated view. Still another is bringing states and localities closer to full partnership with the federal EPA. And progress has been made in exploiting incentives as a complement to "command and control" in achieving environmental gains. Here the temptation will be to downgrade or

discard initiatives identified with the old crew. Obviously, the new controllers will want to assure themselves that these courses are right for the environment in the years ahead. But there is too much important new work to warrant fixing things that are "not broke." Early review of key elements of these approaches, followed by strong affirmation of those which pass muster, can assure that the environment suffers minimally from the inherent turmoil of transition.

So, where can the new crew make its mark? Not on issues such as acid rain and hazardous waste which, while they still require a lot of work, are on the road to resolution. Instead, there will be four big categories on the score card used in the future to judge those coming on duty in 1989. These are:

- How successfully they deal with ambient air quality, especially ozone.

- How they use the opportunities presented by the intersection of agricultural policy and environmental quality.
- Whether progress is made in protecting and rebuilding natural systems.
- How they deal with international challenges.

Ozone pollution will remain among the most intractable problems the



Steve Williams photo Penn State College of Agriculture



A quiet hike in Isle Royale National Park, Michigan. Often, the scene in our national parks is quite different, with crowds of people and a lot of activity.

Richard Frear photo, National Park Service

country faces. As I have written elsewhere (*Science*, September 9, 1988), whether legislation passes this session of Congress or not, the science and technology of control are inadequate; the economic and social costs of proceeding expeditiously to attainment are very high; and at least on current understanding, some areas can't achieve success even in the next century without unacceptable disruption. One of the key tasks over the next four years will be to frame and participate in a broad public debate about environmental goals and practice when, as is the case with ozone, science discovers risks for which the political system and economic and technical reality offer no easy, no rapid, or perhaps even no feasible solutions.

Agriculture affects virtually every aspect of the environmental enterprise: pesticides impact wildlife and human health; chemicals get in ground and surface water; land use changes destroy or create wetlands, other habitat, and visual and recreational amenities; silt

Ozone pollution will remain among the most intractable problems the country faces.

and nutrient run-off degrades streams, lakes, and estuaries. There is an opportunity to take a holistic view of agriculture and the environment to see what makes sense for both together. Even partial success in bringing this integration off would go a long way to assuring good marks from future generations.

The quality of life for Americans in the next century will be irretrievably diminished if actions are not taken soon to enhance and protect the natural systems which we enjoy and on

which we all depend. Many of our national parks are threatened by overcrowding, and much of the infrastructure built in the Great Depression needs repair. Wilderness is disappearing. Water bodies are being degraded by nonpoint source pollution that overwhelms the gains from sewage and industrial waste control. Urban sprawl is absorbing the green belts that add so much to the amenities of cities. Wetlands (and other habitat) that help cleanse the environment and support fisheries and wildlife offering recreation to millions continue to disappear, and the less there is the more each acre counts. Investment will be required to reverse these trends, of course, but even more important will be creative policies that bring private and government incentives into harmony with natural system protection and enhancement. Ideas abound. What is needed is a comprehensive effort to determine which ideas are sound, followed with the will to promote and implement them.

International action will be crucial. Building on the success with stratospheric ozone, the United States will be called on to take a major role in dealing with the prospects for global climate change. On other matters, initiatives may need to start in the developed countries, but the arena for action will be the developing world where deforestation, desertification, the disappearance of species, and toxic pollution of the air and water are global concerns. In the same class are protecting the oceans and assuring the environmental integrity of Antarctica. For two decades, the United States has been a world leader in protecting its citizens and environment from threats from within. The challenge for the 1990s will be to work with others to extend and expand that protection.

A radar screen this full of issues would daunt any crew coming on watch. But some of these blips are more important than others, and even for the most crucial ones, there is time to be careful in plotting a course. What is critical to success is to decide where attention really will make a difference, and then to begin. □

(Russell, formerly Assistant Administrator of EPA's Office of Policy, Planning, and Evaluation, is currently Professor of Economics at the University of Tennessee and a Senior Economist at Oak Ridge National Laboratory in Tennessee.)

Dairy herds can contaminate streams. Agriculture affects the environment in a number of complex ways.

A Scientist/Engineer

by Raymond C. Loehr

The basic mission of EPA is to reduce risks to human health and environment that result from wastes, residues, and contaminants. To carry out this mission, EPA administers a number of programs mandated by law.

However, EPA is actually more than a regulatory agency. It is also a research agency responsible for defining the nature of the nation's environmental problems and their possible solutions. It is a technology transfer agency responsible for sharing information. And it is an education agency responsible for teaching people how their individual actions affect human health and the environment. All of these responsibilities depend on a strong research and development (R & D) program, as a means for priority-setting, along the lines recommended in a recent report by the EPA Science Advisory Board (*Future Risk: Research Strategies for the 1990s*). The Science Advisory Board is an advisory group that provides extramural advice and scientific information to EPA.

Because risk reduction is the core of the EPA mission, EPA needs an R & D strategy that focuses on problems and topics where there is the greatest potential for reducing risk to human health and the environment. This will allow EPA to control wastes and contaminants as efficiently as possible, while focusing limited resources on situations where the greatest reduction of risk can be accomplished.

To date, EPA's regulatory efforts have focused largely on end-of-pipe pollution control technologies to reduce existing pollution problems. This is a result of statutory mandates with tight deadlines and a command-and-control

To date, EPA's regulatory efforts have focused largely on end-of-pipe pollution control technologies to reduce existing pollution problems.

regulatory approach. It also reflects the way society has approached environmental problems: i.e., solve the air pollution problem, solve water pollution problems, control hazardous wastes, clean up abandoned waste sites, get rid of the garbage.

Very little effort has been expended on waste and contaminant prevention.

The end-of-pipe, command-and-control approaches have been measurably successful. Overall, air quality has improved, as has the quality of the nation's streams. However, large quantities of waste continue to be generated to create future pollution problems. For instance, each American generates 25 pounds of trash per week (about 2/3 ton per year), and about one ton of hazardous waste is generated per person per year in the United States.

EPA and the nation should have an R & D strategy that serves to reduce risk and, as a first priority, helps reduce the quantity of waste being generated. Such a strategy would have the following objectives as a hierarchy of priorities (see chart):

- **Prevent waste and contaminant generation:** Risks to human health and the environment can be reduced by cutting down the production of waste and contaminants. Prevention is often the most cost and environmentally effective risk reduction approach.

- **Institute recycling and reuse:** Recycling and reusing wastes and residues can eliminate their release to the environment, thereby avoiding the need for treatment and disposal.

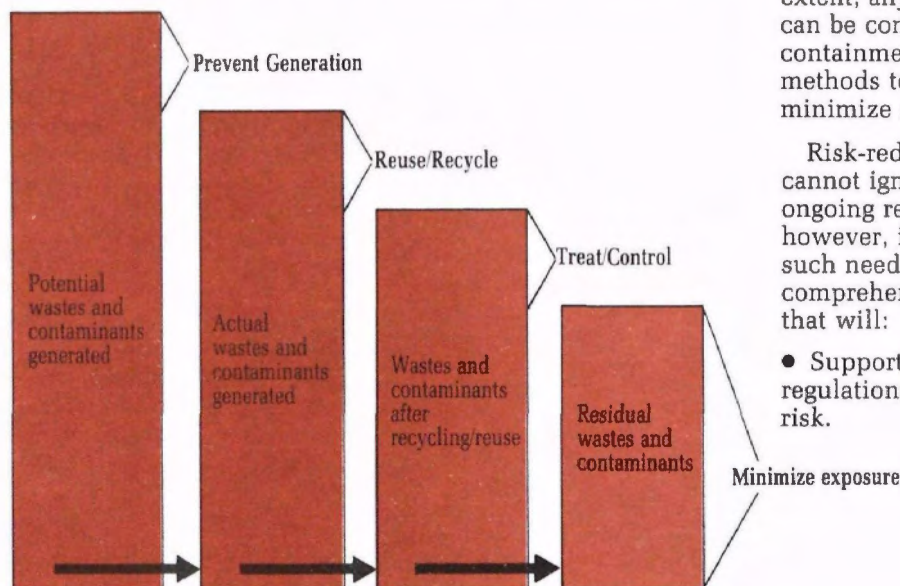
- **Destroy, detoxify, or otherwise treat wastes that cannot be recycled or reused:** A variety of approaches will be needed to treat, destroy, detoxify, and control environmental contaminants to minimize the release of wastes which cannot be prevented or recycled.

- **Minimize residual exposure:** Once the generation of wastes and contaminants has been reduced and the release of the remaining wastes and contaminants has been controlled to the optimum extent, any remaining risk can be controlled by containment and other methods to avoid or minimize exposure.

Risk-reduction research cannot ignore the needs of ongoing regulatory programs; however, it should address such needs in a broader, comprehensive framework that will:

- **Support and facilitate regulations aimed at reducing risk.**

Priorities for Risk-Reduction Research



Each American generates about 25 pounds of trash per week. This refuse was collected from Blue Star Thermal Spring in Yellowstone National Park.

EPA should develop strong scientific programs in each core area, provide facilities and incentives to attract top researchers to these programs, and maintain the stability of funding needed to nurture scientific leadership in these areas.

Strength in the core areas would place EPA in a sound position to develop guidance and approaches for problems that place human health and the environment at risk. To support the regulatory programs, results from core research areas would provide regulatory deliverables that will meet regulatory mandates and deadlines.

Investing in risk-reduction research would reduce current and future risks to human health and the environment, thereby increasing productivity and the quality of life. Such research is an investment that protects not only present but also future generations. □

(Dr. Loehr is the Hussein M. Alharthy Centennial Chair and Professor, Environmental and Water Resources Program, at the University of Texas at Austin. He is Chairman of the EPA Science Advisory Board (SAB), served on the SAB Research Strategies Subcommittee that prepared the September 1988 report entitled Future Risk: Research Strategies for the 1990s, and chaired the Subcommittee's Risk Reduction Work Group.)

National Park Service photo

- Define the risk at issue and develop needed control technology.
- Demonstrate the feasibility of risk-reduction actions that are non-regulatory but consistent with regulatory requirements.

An appropriate R & D strategy would first determine what research and development activities are needed to reduce the risk to human health and the environment, and second, indicate the proper timing of that research and development. Once the extent to which the research (if successful) will reduce risks to human health and the environment is identified, there is a clear basis for balancing competing research needs. In addition, information that can accomplish risk-reduction goals should be provided to state and local governments and to the public. Education

and technology transfer, therefore, have an important place in the research strategy.

Core areas of continuing risk-reduction research should be identified. These

EPA and the nation should have an R & D strategy that serves to reduce risk and, as a first priority, helps reduce the quantity of waste being generated.

core areas would support broad, comprehensive needs of EPA and would be critically reviewed periodically. The core areas should include: topics expected to be relevant for a long time, areas in which generic research can support a number of EPA and state programs, areas in which inadequate information exists for sound regulatory decisions and guidance, and areas where research is unlikely to be conducted by

others. Examples of candidate core risk-reduction research areas are:

- Prevention of pollutant generation.
- Combustion and thermal destruction of wastes.
- Separation technologies to concentrate material that can be recycled.
- Biological detoxification and degradation to result in residues that can be discharged or disposed of safely.
- Chemical treatment of concentrated wastes and residues.
- Ultimate containment methods such as land-disposal options.
- Exposure avoidance.
- Risk communication and perception.
- Incentives for risk reduction.

Setting Environmental Priorities:

The Public Speaks

In the public's opinion, what should be the top environmental priorities of the new Administration when it takes the helm in 1989? EPA Journal asked a cross section of citizens in different occupations from different parts of the country to respond to this question. Here are their answers.

Kenneth Sehres,
Professional Caterer,
New York City

Gary Fells, Acquisition
Agent, Colorado State
Highway Department,
Denver, Colorado

The question has a number of angles. In New York City, I live with the obvious problem of air pollution, and there has been repeated postponement of air pollution standards—for New York and for other cities around the country too. The new administration must take the necessary steps to enforce the clean air standards. The laws are in place, but the enforcement is bad.

Part of the problem is that people cling to their personal freedoms—such as the liberty to drive unlimited numbers of private cars in the Manhattan business district. The city should definitely impose restrictions on private cars, since the alternative is gridlock and bad air. Sometimes it's necessary to sacrifice certain personal freedoms in favor of an environment in which people can breathe and get around to do business.

In addition to air pollution, New York City has all the other problems: ocean dumping, toxic waste, beaches closed for substantial portions of the summer. These problems didn't just happen yesterday. We definitely need more foresight on environmental problems. Something is wrong when we start worrying about garbage problems the day before the landfill fills up.

I'm very concerned about acid rain and its effects on forests, lakes, and streams, so I'd like to see the acid rain problem given very high priority. Also, living here in Denver, with the kind of air pollution problems we have, I'd have to name clean air as a pretty high priority. I have seen the air in the Denver metropolitan area go from crystal clear to the point where on bad days you cannot see the mountains.

For the country as a whole, the cleanup of hazardous waste sites should probably be first on the environmental priorities list.

In general, my advice to the new administration would be: Do not slacken the environmental standards that have been set so far, and don't hold off making those standards stick. For example, maybe extensions for meeting Clean Air Act standards should not always be granted. The prospect of a cut-off in federal funds is a strong motivation. We're on the right track, but we need tight control on environmental problems that ultimately can affect not only our health but also our economic well-being.

Arriving at the beach to see this, a family could find its vacation spoiled. A clean environment ranks high in many public opinion polls.



A series of major disasters has helped make people realize that the environment is in trouble. This is a 1984 photo at the famed Love Canal hazardous waste site, where steps are under way to control the dangers. The pipes protect monitoring wells.

Jean Brodey,
Assistant Professor of
Journalism,
Philadelphia,
Pennsylvania

Industrial pollution needs to be a high priority, since it is polluting our waterways and our living environment. I want to see our rivers and streams protected from contamination. It's also important to preserve our natural landscape in national parks, etc.

We're in a transitional period right now. The most important thing is to have some kind of overall plan for preserving the environment. Suddenly we've reached a turning point with problems like waste management, especially with all the nondegradable trash that's produced—like a barge loaded with garbage floating all over looking for a place it can dock.

Unless there is an overall plan, things will only get worse; we're on the verge of leaving a terrible legacy. The band-aid approach just won't work. We need real planning—nothing haphazard—on the environment.

Robert Kidwell,
Dentist,
Wilmington, Delaware

Environmental priorities? Clean up the air and clean up the water. Regulate the companies that are responsible for the pollution. Big business needs to be held responsible for what it does to the environment. Chemical runoff from the use of fertilizers and pesticides in agriculture is another problem.

The environmental situation is getting out of control. In the Pamlico River, downriver from chemical discharges, the fish are dying off and the survivors are deformed with tumors. Wilmington, Delaware, is one of the worst air spots in the nation. The garbage problem is another thing. We need a new focus on cleanup. Tighten the controls. Impose fines. Otherwise we'll put ourselves right out of the planet.

Janice Warner,
Rancher,
Ten Sleep, Wyoming

Sometimes it seems that the environmental agencies are nit picky on some things when there are other issues that seem so much more important, like all the hospital trash and other waste being dumped in the ocean. For example, if one of the sprays we use on the ranch is a real danger—if it's an absolute concern—then I think the government is right to prohibit it. But we never know why a chemical spray or a dip we use for cattle becomes an issue all of a sudden, and sometimes I wonder how much validity the issue has.

Of course, I want to keep the environment in good shape for cattle ranching. We abide by the environmental requirements set by EPA and the U.S. Forest Service as best we can. But I think the big issues should be the priorities for the environment, and I don't see that happening.

Rita Grodt,
Homemaker,
Modesto, California

My own concerns about the environment are mainly local issues, such as the safety of ground water in the Modesto area, and I can't say how our local concerns fit into the national picture. This is a farming community, and almost everyone around here uses well water. I worry about whether pesticides and fertilizers from the farming might be getting into the ground water. One of the schools in the area had to go to bottled water because their well water became contaminated.

There are possible links between health effects and pesticides to worry about. A couple of years ago—when we were expecting a child—we decided to move here rather than the Fresno area because people were saying there might be a connection between pesticides and birth defects and other health problems in that area. We just wanted to be cautious.

I also think it's important to protect natural resources such as our national parks. We just got back from a week in Yosemite, so I'm struck with the need to preserve this kind of resource.

Stuart McDonald,
Director of Economic
Development,
Jamestown, North
Dakota

Balance is the key word in setting environmental priorities. Protecting the environment is very important, but so are jobs and development, particularly when you consider that American industry has been shipping jobs out of the country like crazy.

The environment is a global problem. In the United States, I think we make a



Robert Senior photo, New York State Department of Environmental Conservation

more serious effort toward control than the rest of the world. North Dakota, for example, is a large producer of electricity, and U.S. producers of electricity are subject to specific constraints to control sulfur dioxide emissions. These requirements involve a real cost impact that is not shared by our Canadian competitors, since Canada has no comparable requirements. This puts our producers at a competitive disadvantage.

I'm in favor of environmental controls, but the constraints we put on American industry have to have counterparts in other countries. We need to allow American industry to compete.

**Dr. Jane Jones,
Psychiatrist,
Summit, New Jersey**

The environment generally should be a higher priority than it has been so far. Everyone seems to wait until a catastrophe is in front of them—something real like a ruined summer at the beach or a cancer diagnosis. It's hard to abstract environmental casualties before they happen. I think this is a problem for the public and for our policy-makers. On the other hand, I was very pleased to see EPA and the Surgeon General take a strong stance on radon recently.

We have so many environmental problems that it's hard to sort them out—toxic waste sites, the water supply, you name it. I see a number of patients who have cancer that could have environmental causes, and I am very concerned about the environment as an urgent priority. I would do any kind of volunteer work on environmental issues. I also think cabinet status should be created for EPA. I'd like to see better enforcement of our environmental laws.

**Pam Pope,
Administrative
Manager,
San Diego, California**

Probably the Number 1 problem is that people are not aware of things going on that damage the environment and don't really understand what's involved in environmental issues. The average person does care about keeping the air clean and the landscape beautiful but doesn't know what to do—so the environment is "some one else's problem." One priority should be making people more aware of environmental pollution problems and doing a better job of getting information across to them. It's a massive public relations project.

The political clout of companies that pollute the environment is also a problem. A lot of companies don't take environmental issues seriously. They hire lobbyists to influence political decisions. In fact, I think companies can use their clout to influence public perception, and that's another reason why people are confused about environmental issues.

I'm personally concerned about the environment, but I also feel pretty powerless. There are so many problems—water quality, water conservation, industrial waste. The protection of national parks would be high on my priority list.

**Richard Ardner,
Director of Public Works,
Loch Haven,
Pennsylvania**

The first priority should be Superfund sites—expediting the cleanup of existing hazardous waste sites. This needs to proceed at a speedier pace than it has in the past.

Second, it's important to work more closely with industry—with the generators

of hazardous waste—to make whatever changes may be necessary to cut down the output of hazardous waste. The same principle applies to the rest of society. If our life style is damaging the environment, we may just have to learn to cut back on some things.

For instance, if a product that enhances our life style introduces a hazardous byproduct into the environment, then maybe we can do without that product. Maybe we need to think twice about what we're doing as consumers. This is a public education issue, and EPA should do as much as it can, where it can, in this area. With public education, of course, the place to start is with children in grade schools.

A final word on the environment generally as a priority: we have been to outer space, but so far we have found only one livable earth.



Steve Delaney photo

**Elizabeth Denk,
Marketing Services
Director,
Niagara Falls, New York**

Living in Niagara Falls, the top environmental concern for me is landfills because I worry about leakage problems. I worry about something happening like it did with Love Canal. I think we need to take a hard look at our whole waste disposal system. It seems we just don't have the knowledge to know what's going to happen down the line once we start a landfill.

On the environment in general, I will say that recently—in the last five years—there seems to be more crackdown in enforcing anti-pollution laws. There should be a continued emphasis on enforcement at the local level. It's OK for Congress to legislate a clean environment, but unless there's somebody looking over their shoulder, some companies are not going to comply with pollution control requirements.

Another big issue is the ozone layer and the aerosols we use. Everyone has some kind of aerosol product around the house. Where there are alternatives to the aerosol products, I think the aerosol should be banned.

**Dona Krueger,
Independent
Salesperson,
Hastings, Nebraska**

The top priority should be water quality—our drinking water, our lakes and marine resources. Among other things, this means enforcing the Clean Water Act and getting serious about cleaning up Superfund sites. There's a definite need for more enforcement of the laws that are supposed to protect the environment.

It's time to make the contaminators of the environment take responsibility for the consequences of their actions and pay for cleanup. If I don't pay my bills, or if someone is hurt on my property, I am responsible. But the same rules don't necessarily apply to big industry. It seems like the nation as a whole is intimidated by industry, afraid to hold big industry accountable.

It's also hard for ordinary citizens to get practical information on the environmental problems that affect them in their own communities. I'd like to see EPA upgrade its hotline services in this area.

**Kathy Taylor, Student,
(biology major),
Utah State University**

Radioactive waste is definitely a big priority—especially the problem of how to dispose of it. Also, one of the biggest problems now is the amount of trash we routinely produce every day, and a lot of it is not biodegradable. We need to stop using plastic (the plastic hamburger cartons are everywhere) and return to paper products. Something also needs to be done to stop

pollution of the ocean with all kinds of waste.

There are regulations to protect the environment from some of these things, but they need to be enforced. I think we need more enforcement.

Radon gas is another kind of big environmental problem. To protect people's health, I would be in favor of mandatory testing of public buildings, maybe even private homes. At the least, there should be a strong program to make people aware of the health risks.

**Vernon Weaver,
Real Estate Inspector,
Baton Rouge, Louisiana**

I think the first and foremost environmental issue is radon, especially now that it's been found in water systems. Second would be the problem of depleting the ozone layer, since this could affect people worldwide.

Third, the seas and coastal areas have a whole set of environmental problems. In the South in particular, we are losing a lot of coastal marshes for different reasons, which means lost environments for fish.

Acid rain is another priority issue, probably more so for people who live in other regions than the South. Also, there are still safety problems with some pesticides.

**Martin Bander,
Hospital Public
Relations Director,
Boston, Massachusetts**

We desperately need to find a safe way to store nuclear waste. Second, we need to find out whether we are entering an age of the Greenhouse Effect, and if so, we need to move rapidly to address the problem. This has to be done on a worldwide basis and must include reforestation, not deforestation.

My personal belief is that we need to wage an all-out war on pollutants of the air, earth, and water. □

**Kathy Chamberlin,
Flight Attendant,
Washington, DC**

Flying on a routine basis, I am struck with the pollution I see in the sky over so many cities. Doing as much as we can to eliminate air pollution should definitely be a high priority. Sometimes the air is so bad over cities like New York, San Francisco, or Washington, DC, that all you see is a layer of dirty smoke, sort of a black film, as the plane makes its approach.

I realize a lot of things that contribute to air pollution are difficult to control. You can't stop people from driving, and you can't make people junk their older model cars. But there are things that can be changed. For one thing, maybe the technology for emissions control isn't as good as it could be.

I also worry about all the trees being felled all the time. The more trees that go down, the more pollution there is. It's not really necessary to bulldoze whole fields in order to build a housing development. We need to stop the heedless destruction of trees because there could be more consequences than we know about.

**Jo Lombard,
Piano Teacher,
McLean, Virginia**

There are so many environmental problems, all inter-related, that it's hard to separate out particular priorities. We need action, not more talk, on lots of fronts: clean air, clean water, the ozone layer, the disappearing rain forests, waste products (like plastic) that won't go away. Maybe the important thing is not the order in which we list the problems, but how the issues are related to each other, because we have one environment, one atmosphere, one earth.

Part of the overall problem is that our society is not structured to be responsive to environmental issues on principle, but responds mainly to money issues. We have a society that can sell pet rocks and all kinds of offbeat fads, but can't sell the idea of teamwork to conserve the environment. I think it would be well worth the taxpayers' money to hire a Madison Avenue public relations firm to raise national consciousness about our common stake in the environment.

As a society, we need to start making some changes that aren't money-makers but make sense if we want to preserve the environment. □

(EPA Journal Assistant Editor Karen Flagstad conducted these telephone interviews.)



The Need to Think Ahead

by Alvin L. Alm

If the recent barrage of media accounts is any indication, environmental issues once again are crowding to the forefront of the national consciousness. People today are worried about the skin cancer that may result from depletion of the stratospheric ozone layer, and the lung cancer that may result from concentrations of radon found in their homes. This past summer's drought raised new questions about the possible long-term effects of global warming trends. The medical wastes that washed up on so many East Coast beaches last summer spotlighted two problems: Americans are not managing their mounting piles of solid waste very effectively, and our near-coastal waters are being degraded by a wide range of pollutants and contaminants. And despite our past efforts, recent well-publicized data show that millions of Americans live in urban areas that still do not meet national health standards for ozone and carbon monoxide.

Which of those problems poses the most serious health and environmental risks? Or are the most serious risks posed by other environmental problems—like acid rain or pesticides in ground water—that haven't received as much media attention recently? I don't know the answers to those questions, but I do know this: the long-term scientific research that is needed to help answer critical questions related to environmental quality and public health is woefully underfunded and underemphasized in this country. As we move into the 1990s and beyond, our national willingness to support long-term scientific and engineering research may be one of the most serious environmental policy issues of all.

Research is an absolutely essential ingredient in our national effort to

protect environmental quality. Research helps us understand the causes and effects of environmental pollution; it helps define how and where pollutants are transported; it characterizes the mechanisms of human exposure and the risks entailed; it supports the development of technologies needed to minimize, treat, and control pollution. In short, research gives us the knowledge we need to protect human

The long-term scientific research that is needed to help answer critical questions related to environmental quality and public health is woefully underfunded and underemphasized

health and the environment from the inadvertent byproducts of our technologically advanced society.

Environmental research has always been an important part of EPA's mission. The "capacity to do research" was included among EPA's responsibilities in the Presidential directive that established EPA in 1970. In the years that followed, Congress passed several major laws that required EPA to protect different elements of the environment, and each of those laws required a regulatory system dependent on the results of environmental research. Consequently, over time, EPA's research program has become primarily a support for the Agency's near-term regulatory responsibilities.

Yet, despite the evident success of our past research and regulatory efforts, EPA's practice of focusing its research almost exclusively on near-term regulatory needs will not be adequate for protecting environmental quality in the future. There are several reasons why:

- EPA's regulations by definition reflect environmental laws, which in turn reflect public concern about various environmental problems. However, public concern and federal law are not necessarily accurate reflections of real-world health and environmental

risk. Environmental research has to be targeted at the greatest risk.

- EPA's regulations tend to impose end-of-pipe controls on classes of pollutant sources nationwide. However, some of the most serious environmental problems facing us in the future—like solid waste and ground-level ozone—will require us to minimize pollution before it reaches the end of the pipe. Environmental research has to be targeted at risk-reduction strategies like materials substitution, process redesign, and recycling that can be initiated voluntarily or as a product of the regulatory process.

- Minimizing waste and pollution before they reach the end of the pipe will require that state and local governments, private industry, and individual families all take actions to reduce their contribution to the problem. Such a decentralized approach to some environmental problems will substantially augment EPA's traditional regulatory role. Environmental research has to be targeted at control techniques and strategies useful to all parties involved.

- EPA's current regulations often result not in the eradication of a waste or pollutant, but in its transfer from one environmental medium to another. Our past lack of attention to the cross-media effects of pollution control is understandable considering the medium-oriented nature of environmental laws like the Clean Air Act and the Clean Water Act. But we can no longer afford to look at environmental problems in such a narrow context. Environmental research has to be targeted not at the transfer but at the elimination of pollution.

- EPA's regulations obviously are intended to control environmental problems that have already been recognized by the public and Congress. Yet, as we have learned from the history of medicine, it is easier to prevent a disease in the first place than it is to cure a large number of people afflicted with it. Environmental research has to be targeted at the anticipation and

What's killing these trees on Mt. Mitchell, North Carolina? Scientists are discovering links between pollution and such forest diebacks. Research aimed at defining potential environmental dangers before such damage is done could help ease the stress on the planet.

James J. MacKenzie photo

prevention of environmental problems, not simply their cleanup after the fact.

Over a year ago, EPA Administrator Lee Thomas requested the Science Advisory Board (SAB) to advise him on ways to improve strategic research planning at EPA. In response to that request, the Research Strategies Committee of the SAB prepared a report, *Future Risk: Research Strategies for the 1990s* (September 1988), that—together with its five technical appendices—provides clear guidance for

shaping a strong environmental research program.

The report lists 10 specific recommendations (see box) that, in a nutshell, make three major points. First, EPA's research funding has to be increased dramatically. Second, EPA's research program has to be reoriented to include a much greater emphasis on long-term research not necessarily linked to its regulatory programs. Third, particular emphasis must be placed on understanding the status and trends of ecological systems to anticipate

potential future problems. If we can take the steps necessary to implement those recommendations, then I am confident we will have the scientific and engineering tools we need to solve the most pressing environmental problems of the 1990s and beyond, no matter what they may be. □

(Alm is Chair of the Science Advisory Board's Research Strategies Committee and President and Chief Executive Officer of Alliance Technologies Corporation.)

Ten Recommendations for the 1990s

In its September 1988 report, *Future Risk: Research Strategies for the 1990s*, the Science Advisory Board made 10 specific recommendations that relate to the long-term goal of preventing and reducing environmental risk. These 10 recommendations are summarized below:

1. EPA should shift the focus of its environmental protection strategy from end-of-pipe controls to preventing the generation of pollution. EPA should use a hierarchy of policy tools that support national efforts to 1) minimize the amount of wastes generated; 2) recycle or reuse the wastes that are generated; 3) control the wastes that cannot be recycled or reused; and 4) minimize human and environmental exposures to any remaining wastes.
2. To support this new strategy, EPA should plan, implement, and sustain a long-term research program. In conjunction with EPA's program offices and the external scientific community, EPA's Office of Research and Development should develop basic core research programs in areas where it has unique responsibilities and capabilities.
3. EPA needs to establish better mechanisms to ensure that a coherent, balanced R&D strategy is planned and implemented. EPA needs to establish an internal Research Strategy Council to oversee its R&D program; a standing committee of the Science Advisory Board should provide an

independent review of EPA's core research program; and the Assistant Administrator for Research and Development should be changed from a political to a career position.

4. EPA must improve its capability to anticipate environmental problems. EPA should explicitly develop and use monitoring systems that help the Agency anticipate future environmental conditions, and it should create a staff office that would be responsible for anticipating environmental problems and then recommending actions to address them.
5. EPA should provide federal leadership for a national program of ecological research by establishing and funding an Environmental Research Institute. The Institute would conduct a core ecological research program, monitor and report on trends in ecological quality, and provide a catalyst for ecological research efforts funded by other federal agencies, state governments, universities, and the private sector.
6. EPA should expand its efforts to understand how and to what extent humans are exposed to pollutants in the real world. To help improve current understanding of human exposure, EPA should place much greater emphasis on the use of personal monitors and biomarkers, and it should validate many of its human exposure models.
7. EPA should initiate a strong program of epidemiological

research. Such studies should be designed to support regulatory efforts and to develop information on potential new environmental and health problems.

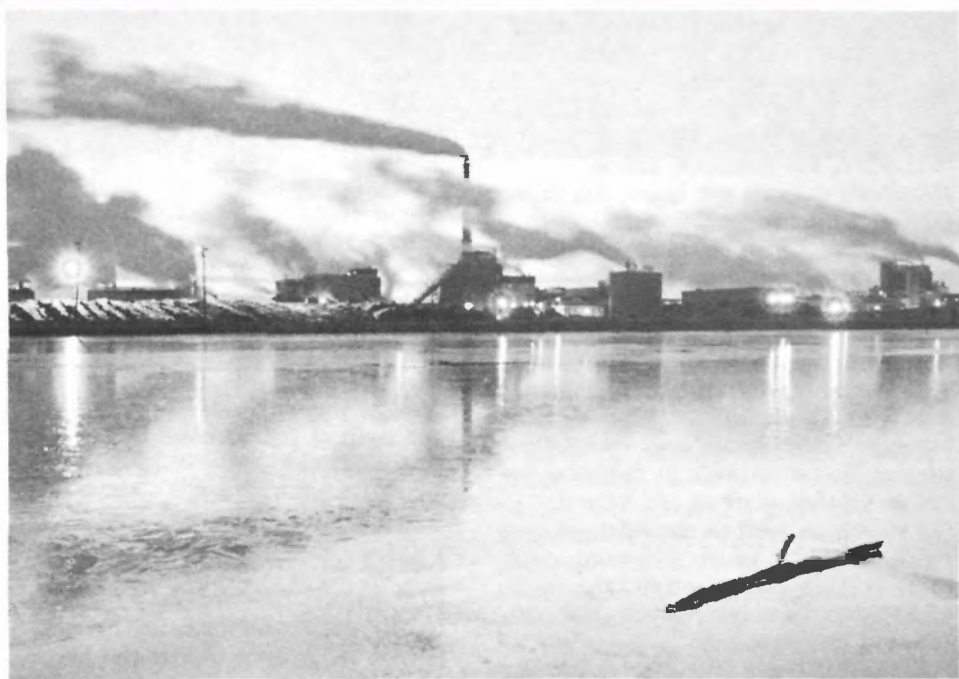
8. EPA should expand its efforts to assist all those parts of society that must act to prevent/reduce environmental risk. Since state, local, individual, and private sector actions will become increasingly important for reducing the amount of waste and pollution generated, EPA needs to improve the education, training, technology transfer, and research programs that support such actions.

9. EPA needs to increase the numbers and sharpen the skills of the scientists and engineers who conduct environmental research. EPA should increase grant programs and initiate training programs to increase the national supply of technical personnel, and it should use existing mechanisms, such as the Intergovernmental Personnel Act, to bring about a closer collaboration between EPA scientists and engineers and the external scientific and engineering community.

10. EPA's R&D budget should be doubled over the next five years. If the nation is willing to spend \$70 billion per year cleaning up and protecting the environment, then it is reasonable—indeed, barely sufficient—to spend one percent of that amount on EPA research that helps determine how the national environmental protection budget can be allocated most effectively.

Environmental Problems: The Situation

by Jack Lewis



Mike Brnson photo

What should be the nation's environmental priorities as we move toward the 1990s and the 21st century? How should we go about the business of priority-setting? What criteria should determine our national priorities on the environment? These are questions addressed by people with different vantage points earlier on in this issue of *EPA Journal*.

Despite the controversies surrounding priority-setting, one point is indisputable: Whatever its outcome, the priority-setting process must be based on a firm understanding of the total universe of environmental problems now confronting the United States. EPA's Office of Policy, Planning, and Evaluation has recently issued a report, entitled *Environmental Progress and Challenges: EPA's Update*, which summarizes environmental problems

Industries, as well as municipalities and people themselves, contribute to pollution. A cleanup is under way on all fronts, although the question is whether it will be enough. In Wisconsin's Fox River Valley, pictured above on a wintry day, the paper industry is an active partner in a pollution control plan.

across the spectrum, describes the progress made in each problem area, and outlines the challenges that remain.

Drawing on this August 1988 report, the following discussion is intended to provide background information on the major environmental problems that compete for finite resources and attention—with no endeavor to rank these problems in any order of priority or importance (and no priority ranking implied by the order in which problem areas are discussed).

Water

Water-pollution problems fall into three basic categories:

- *Protection of drinking water.* More Americans are receiving safer drinking water than ever before; the most severe public health effects from contaminated drinking water have been eliminated. However, there are still some less acute hazards associated with a number of specific contaminants, such as lead, radionuclides, microbiological contaminants, and disinfection byproducts. These hazards are particularly troublesome in small community systems, which have a low level of compliance with national drinking water standards.

One challenge facing the Agency is how to motivate the public to bear the costs of dealing with the growing number of contaminants EPA is now requiring public water systems to regulate. Another is to overcome the financial problems faced by these systems, especially the smaller ones.

In addition, EPA is concerned about protecting surface and ground-water sources of drinking water from further contamination. EPA and the states will need to continue working to improve wastewater treatment, as well as to deal with problems caused by toxic pollutants. The extent and significance of contamination by toxics has not yet been fully assessed, but the 1986 amendments to the Safe Drinking Water Act are requiring water systems to extend both their monitoring and treatment.

- *Protection of surface and ground water.* Protection of America's surface water has been the focus of concerted action for many years. Billions in federal funds have been spent to construct wastewater treatment plants, and industry has invested heavily in equipment to "pre-treat" its toxic effluents. Today the emphasis of

surface-water programs is on consolidating the gains of the past, while transferring growing parts of their management to state and local officials. There is also a new effort to curb nonpoint pollution coming from agricultural and urban run-off.

Ground-water protection is a newer but ever-growing area of Agency concern. The major challenge today is to build capacity among state governments

The nation needs an integrated long-term waste management strategy, with ocean dumping no longer the "quick fix" alternative to other options.

and Indian tribes for dealing with ground-water protection tasks, such as the safeguarding of wellhead areas. This is not always easy because of the scientific and regulatory complexity of the problems encountered.

- *Protection of critical aquatic habitats.* Oceans, near-coastal waters, estuaries, and wetlands have been underprotected in the past. Their deterioration was highlighted this past summer when swimmers fled beaches littered with medical waste and infected with fecal coliform.

More aggressive action is required—and required very soon—to save these aquatic habitats from further contamination, or even from destruction. The nation needs an integrated long-term waste management strategy, with ocean dumping no longer the "quick fix" alternative to other options.

EPA also has a continuing commitment to the problems of wetlands, estuaries, and near-coastal environments. Their protection, however, will present major challenges since by the year 2000, 75 percent of the U.S. population will live within 50 miles of our coastlines.

Air

The past 18 years have brought improvements in U.S. air quality. For example, atmospheric levels of lead, ozone, carbon monoxide, airborne particulates, sulfur dioxide, and nitrogen oxides have all been reduced, in some cases sharply. However, the reduction of a problem does not mean its elimination, and the challenges ahead remain formidable.

The problem of ground-level ozone or "smog" has proven particularly difficult to control. For example, ozone standards are still not being met in over 60 major urban areas. Carbon monoxide standards are also being violated in many of these cities.

Another concern is sulfur dioxide—an important precursor of acid rain. In this case, individual vehicles are not the problem, but rather emissions from power plants that burn high-sulfur coal. New scrubber technologies are expected to play an important role in reducing the sulfur dioxide content of future emissions (as well as the nitrogen oxides that also cause acid rain). And there is wide discussion in Congress and elsewhere about how to deal with the acid rain problem.

There has been considerable progress in controlling large and intermediate particulates (dust, smoke, diesel exhaust, etc.), but smaller particles still require more rigorous controls. To deal with this problem, EPA has promulgated a new inhalable particulate standard that will require substantial enforcement efforts over the next few years.

The problem of air toxics also requires more attention. These are toxic chemicals released into the atmosphere by chemical factories and refineries. EPA is developing national standards for these substances; since 1984, the Agency has also developed and implemented a national air toxics program that is helping the states to monitor and control high-risk local problems.

A number of previously unrecognized problems have complicated the picture, such as radon and other indoor air pollutants, including asbestos, environmental tobacco smoke, formaldehyde, and airborne pesticide

residues. More research is needed to identify and rank the exact health risks that result from exposure to individual indoor pollutants, or mixtures of multiple indoor pollutants. There is also a need for easy-to-operate, commercially available devices to monitor personal exposure to indoor air pollution, as well as better methods for diagnosing building-related illnesses, and correcting their structural causes.

Two other air-pollution problems have also risen to prominence in the 1980s: global warming (the so-called "greenhouse effect") and stratospheric ozone depletion. The central challenge is to develop a better understanding of these problems, and how they relate to human health, agriculture, and natural ecosystems. There is also a keen need for new technologies and new chemicals that will not deplete the ozone layer, as well as ways of counteracting the build-up of gases linked to global warming.

Large portions of U.S. land are threatened by contact with toxic, radioactive, and other types of hazardous substances.

Land

Air and water pollution are easier for most people to conceptualize than land pollution. But the fact remains that large portions of U.S. land are threatened by contact with toxic, radioactive, and other types of hazardous substances. Sometimes this contamination occurs through direct application, as with pesticides; it can also, however, occur as a result of improper disposal or storage of these substances, or their waste products.

Four major challenges face officials in government and industry who are now trying to protect our land:

- *Preventing future contamination from improper waste disposal.* Focusing on major generators, and storage, treatment,



Mike Brisson photo.

and disposal facilities, EPA is taking steps with the states to ensure the proper management of municipal and hazardous wastes. Many believe that municipal recycling and industrial waste reduction should become the centerpiece of a progressive national waste management strategy.

- **Cleaning up releases of hazardous substances.** One of EPA's most important responsibilities is to clean up the worst of the uncontrolled hazardous waste sites in the United States. Tremendous efforts will be required to develop the scientific and technical expertise needed for permanent clean-up remedies. The technical difficulty of cleaning up these sites can only be overcome by conducting research, developing technologies, and gaining further experience in the detoxification and destruction of wastes.

- **Tackling pollution from underground storage tanks.** EPA is helping the states to develop programs that will assist in managing underground storage tanks. Better tank design as well as leak detection devices are crucial to these efforts. The cleanup of areas already contaminated by leaking underground storage tanks is another major challenge that EPA and the states are now facing.

- **Emergency Planning and Community Right-To-Know.** The Emergency Planning and Community Right-To-Know Act of 1986 has redefined the way EPA, the states, and local government must deal with the presence of chemicals in

individual communities. Better planning for chemical emergencies is already underway, and so is the gathering of information both to assist emergency planners and inform local citizens. Ongoing attention to these problems is certain to be a major EPA challenge in the years ahead.

There are other problems related to chemicals in the U.S. environment. EPA has already devoted a great deal of attention to toxics such as dioxin, asbestos, and PCBs; these efforts must continue in the future. But other potentially toxic substances still need to be evaluated and possibly regulated. In addition, a new category of substances, biotechnology products (the new substances that are now being created through laboratory gene-splicing), will require review and regulation as appropriate.

One broad class of chemicals poses a particularly pervasive challenge to human health and the environment: namely, pesticides. EPA's continuing challenge is to reduce the health risks from pesticides. Consumers may be exposed through their diet, their drinking water, and their use of products targeted for home use, while farm workers and pesticide applicators are particularly vulnerable to pesticide exposure. The Agency must also protect fish and wildlife in habitats threatened by pesticide contamination.

EPA must continue to place strong emphasis on reviewing all varieties of new chemicals, and completing that review before they are introduced into commerce—and into our environment. Integral to that process must be scientifically valid methods for

determining the health and environmental hazards each chemical presents.

Looking Ahead

Any survey this broad can give only a rough idea of the challenges now facing EPA. Focusing on one medium at a time is in itself misleading, for environmental problems seldom stay confined to one medium. As a result, cross-media approaches are becoming increasingly important. Also, there is growing recognition that risks are not uniformly distributed nationwide, and that priority-setting must be built on a consensus not just of federal but also of state and local officials, as well as average citizens.

At the moment, there is no clearcut consensus for the 1990s. As this issue of *EPA Journal* illustrates, experts in the environmental arena and members of the public have different views on what should be the top environmental priorities for EPA and the nation. □

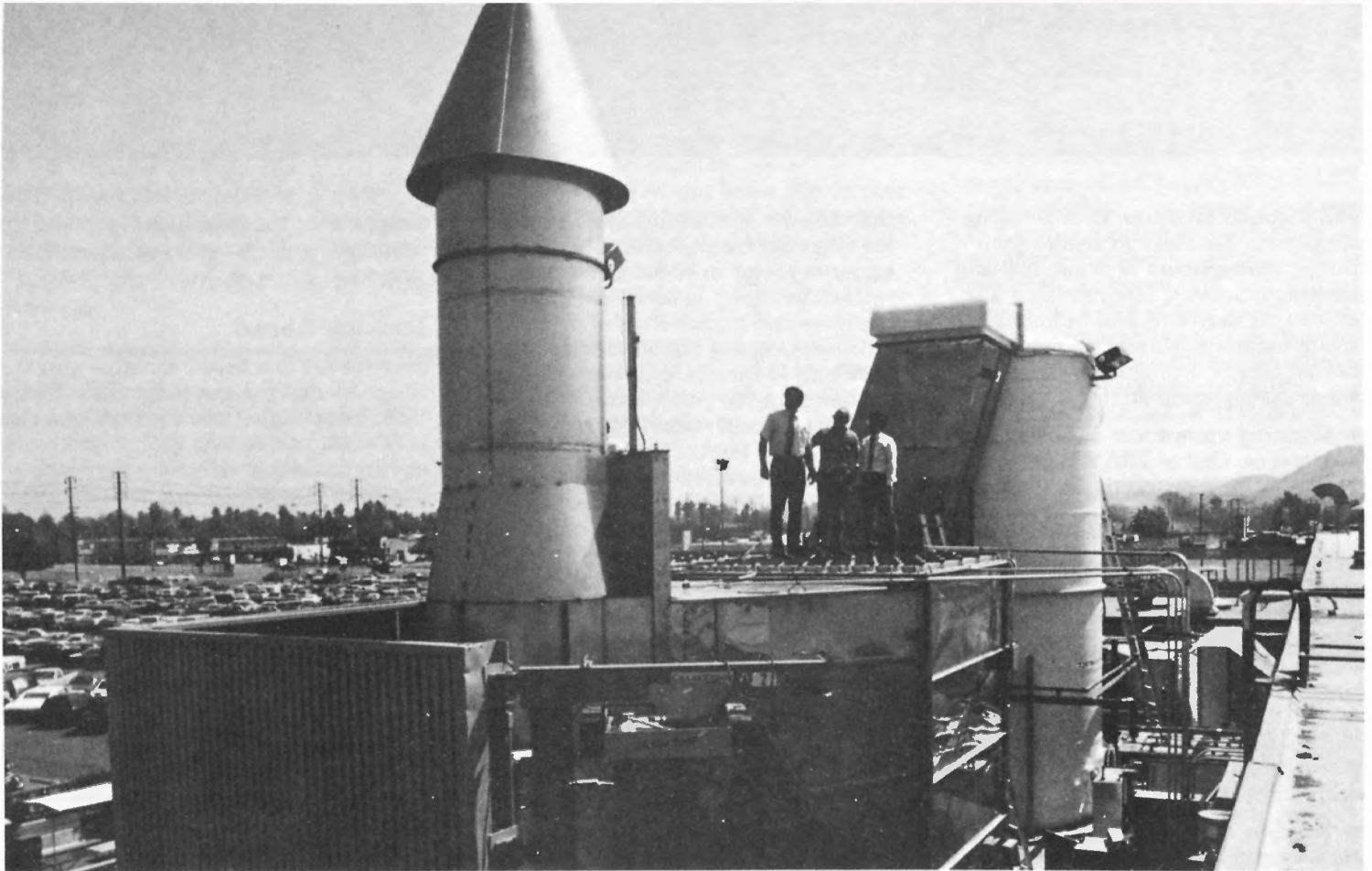
(Note: Anyone interested in obtaining a copy of *Environmental Progress and Challenges: EPA's Update* may contact the Public Information Center, U.S. Environmental Protection Agency (PM 211B), 401 M Street SW, Washington, DC 20460.)

(Lewis is an Assistant Editor of *EPA Journal*.)

Pollution Prevention: Getting a Higher Priority

by Jerry Kotas

A new Enhanced Carbon Absorber System at General Dynamics, Pomona, California. The \$1.2 million system is 95-percent efficient in removing airborne solvent emissions from the facility's paint shop and converting them to carbon dioxide and water.



EPA has launched a major new effort to reduce the threats posed by environmental pollution. The newly created Pollution Prevention Office is charged with promoting an integrated environmental ethic stressing the prevention of pollution before it becomes a problem.

This new approach is profoundly simple and yet radically different from the Agency's past efforts to protect

health and the environment. This approach recognizes that many of the benefits of controlling pollution have already been achieved. Further environmental gains must come from preventing the release of pollutants.

Recent news reports, from medical wastes on the beaches to global warming trends, underscore this new reality. Our society can no longer ignore the impacts of our patterns of production, consumption, and disposal on the natural resources we depend on for our survival. We must begin to develop a unified view of

environmental media—air, water, and soil—so as to avoid an “environmental merry-go-round” whereby regulation of one medium simply shifts pollution to another.

There are sound reasons supporting a cross-media, preventive approach:

- The sheer volume of wastes generated in the United States is threatening to overwhelm the absorptive capacity of our environment. The nation generates enough garbage each year to fill a convoy of 10-ton trash trucks 145,000 miles long.
- Burning all our wastes is not the ultimate answer. Incineration can reduce waste in some circumstances, but it also generates ash which may need to be managed as a hazardous waste.
- Pollution prevention can make economic sense. U.S. industry currently spends \$70-80 billion annually on pollution control. Preventing pollution can save a company money through product and energy cost savings and lower outlays on pollution control equipment.

The job of preventing pollution cannot rest solely with EPA or with government in general. EPA does not plan to dictate how each factory should operate its production processes, nor to dictate to consumers whether to select plastic bags or paper bags at the supermarket checkout line. But we will be helping all sectors of society to take a close hard look at how our choices are affecting the environment, and to consider ways in which we can create fewer pollutants.

Industrial managers at the plant level, for example, can examine materials and process changes, as well as inventory control methods in order to release

fewer and less toxic chemicals into the environment. Consumers can purchase fewer disposable products, or recycle their garbage, or purchase products that contain recycled materials.

EPA's new Pollution Prevention Office will be the focal point for the Agency's prevention activities and a

Many of the benefits of controlling pollution have already been achieved. Further environmental gains must come from preventing the release of pollutants.

major impetus behind an integrated, cross-media approach to pollution prevention. An important early action of the Office will be the publication of a Pollution Prevention Policy Statement in the *Federal Register*. It will announce the development of the Agency's multi-media prevention strategy and commit the Agency to working with public and private individuals and organizations to foster the adoption of this new environmental ethic into our national culture. The Pollution Prevention Office will be guided in this and other efforts by an advisory committee comprised of senior representatives from EPA's Headquarters program offices and regional offices.

State and local governments will be encouraged to play a leading role in helping to shift management priorities of industry and the public. Because the states will be central to the success of this policy, one of EPA's primary goals is to support the development of state and local pollution prevention programs.

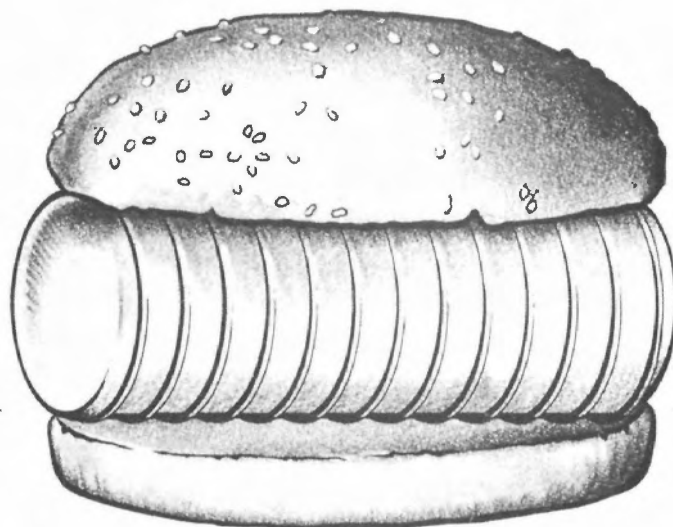
Other elements of the Office's strategy include an aggressive outreach program directed at state and local governments, industry, and consumers to publicize the opportunities and benefits of pollution prevention. A multi-media clearinghouse will provide educational and technical information on source reduction that will be especially helpful to medium and small industrial facilities. The new Office will work closely with EPA's program offices to identify and address any existing regulatory barriers to pollution prevention and to incorporate pollution prevention into every feasible aspect of Agency decision-making and planning.

Our agenda is ambitious, but the stakes—maintaining a livable environment in the 1990s and beyond—are high. Pollution prevention is an idea whose time has come. □

(Kotas heads EPA's newly created Office of Pollution Prevention within the Office of Policy, Planning, and Evaluation.)

Borrowing an Idea from Big Mac

by Ron Brand



Do these issues sound familiar to you?

- Constant personnel turnover, low pay, continual need for training.
- Need to provide and maintain service at thousands of locations.
- Need to find improved methods of doing hundreds of different operational tasks.

These are issues that franchising operations around the world face every day. They certainly sounded familiar to us as we confronted the problems of administering a program to regulate 2 million underground storage tanks at some 750,000 facilities in 3,000 counties across the United States.

In November 1984, Congress passed Underground Storage Tank (UST) legislation requiring EPA to set new standards for tank design, to ensure the proper installation of new underground tanks (roughly 80,000 new tanks are being installed each year), and to assure that all tanks subject to federal law have adequate leak detection and prevention equipment. In view of the nature and scope of this regulated universe, EPA Administrator Lee Thomas and Deputy Administrator Jim Barnes decided that a successful UST program could probably not be designed along traditional lines. To begin with, 2 million existing USTs make up a large regulated community. Moreover, in setting up the UST program, EPA was dealing with hundreds of thousands of small business owners of storage tanks, and we didn't even know who or where they all were. For these reasons, I was asked to head up a Task Force to design a viable program, within the Office of Solid Waste and Emergency Response, under Assistant Administrator Win Porter.

What was the situation? Of the 2 million existing underground tank systems, 80 percent or more were unprotected against corrosion, making them prone to leakage, and lacked genuine leak detection safeguards. No one knew how many were leaking. Industry said 5 percent; studies from EPA said up to 35 percent.

Under these circumstances, a federal program along ordinary lines, with federal control, federal dollars, and thousands of federal inspections, was out of the question. What to do? In fact, much work was already being done at the local and state levels. Tanks were originally put underground to prevent fire and explosion hazards. Most fire departments permit and inspect new tank installations. Some state environmental agencies were addressing problems of leaking tanks, abandoned tanks, and cleanup of contaminated tank sites. How could we make allies of these numerous entities to help build a nationwide program?

We looked for other "models." Did situations analogous to ours exist elsewhere? Who had dealt with problems of developing a distribution system, nationwide, with products or services to be distributed through a large network of suppliers. Franchisers do it, but not from one or 10 locations, but hundreds or thousands of locations.

As we saw it, many franchisers had been successful on two counts at thousands of locations:

- Developing services.
- Continuously assessing, maintaining, and even improving performance.

That looked like the kind of job we were faced with: how to develop and

improve performance on USTs in 3,000 counties and 56 states and territories.

We invited senior executives of some of the most successful franchisers in the country to meet with us, including Century 21, McDonalds, Service Master, and 7-Eleven. They spent two days with our regional program managers and headquarters managers discussing issues such as these:

- How do you maintain consistent service and quality?
- How can you be sure a Big Mac served in Fresno will taste the same as one served in Fort Lauderdale? (By the same token, how can you be sure a new tank in each of these same cities will be properly installed?)
- What are the problems in having many sites of service? (Fifty states, 3,000 counties for the UST program; thousands of franchise stores for McDonalds and 7-Eleven.)
- How do you provide technical assistance and training for the people doing the real work of serving the customers?
- How do you deal with personnel where jobs tend to be low-paying and turnover is high?

As we took a closer look at the franchising concept, the similarities became more and more evident. We embraced its principles wholeheartedly, but carefully selected those aspects which seemed applicable to our program.

In the Office of Underground Storage Tanks (OUST), we, like private industry franchisers, "have to achieve all our results in the field, in thousands of local communities." We too see it as our primary job "to help the local franchisees (in our case, the individual states) succeed"; we too "have no cash registers at headquarters."

We learned some pragmatic lessons. Most importantly, if you want to be successful as a franchiser, your overriding concern has to be helping the franchisee succeed, and that spirit and attitude must be the basis of everything you do. For us, that means helping the local and state agencies carry out the actions needed for a successful program. In OUST we have no alternative—we can succeed only through our "franchisees."

The factor critical to our success is the EPA regional office staff (corresponding to franchiser district offices). Our OUST regional staff represent EPA to the states on a day-to-day, year-to-year basis. The private sector franchisers all made frequent trips to the franchisees for assistance and review. For OUST to do the same, we had to get significantly higher travel allowances for our regional program managers and their staffs.

In the private sector, when district office representatives visit the franchisee, they must, as a rule of thumb, bring something to the table. In our case, simply bringing grant funds isn't enough to get the environmental job done right. Some of the tools we have developed or are developing for regional staff to bring to the table include:

- Pilot projects on improved methods of cost recovery, site assessment, corrective action, and priority setting for site response.
- A computerized system designed to help states decide on appropriate clean-up actions (now being tested in Nebraska, Massachusetts, and Missouri).

- A computerized review of the regulations, which provides a number of easy ways to look up any portion of the regulations and to get additional interpretation.

- Videos on tank closure and on tank installation, shot in the field with "real workers" and made available to the franchisees, and also broadcast over the National Fire Protection Association satellite network to fire stations across the country.

Just like the franchisers we have actions that will occur tens or hundreds of thousands of times

- Handbooks on: Funding Options for States and Local Governments; Cleanup of Releases from Petroleum USTs; and Building State Compliance Programs. In addition, for the broader community concerned about tanks, we produced a simplified, plain-English, illustrated version of the regulatory requirements primarily for tank owners and operators, called "MUSTS for USTs."

We strive to ensure that these are all distributed through our regional program managers, and not from headquarters, thus building their role as the key contacts for the states/franchisees.

Finally, like the franchisers, we have been developing "assembly lines" or "flow charts" of all the processes involved in carrying out the UST program. For example, the "tank closure" assembly line has over 75 steps, ranging from deciding whether it is best to close the tank in place or remove it from the ground to deal safely with explosive vapors, to checking the site for contamination to see if clean-up action is needed. As we view it, every

step is an "opportunity for improvement." Because just like the franchisers we have actions that will occur tens or hundreds of thousands of times, and improvements in each step can mean dramatic improvements when applied nationwide.

All of this relies on training, training, training! For us, the focus is on training state personnel so that they are prepared to conduct inspections and make decisions on approving new tank systems, on completing safe closures, and on determining clean-up actions. The successful national franchisers tell us that training is one of the most essential and useful services they provide their nationwide networks. The headquarters staff don't necessarily do the training themselves, but provide the tools and mechanisms (videos, handbooks, workshops) to make it happen in the field.

Some of the other things the franchisers stressed were:

- Doing applied research to make each task simpler and to ensure quality control.
- Listening to your franchisees—that's where most of the ideas for improvement and new services come from.

This is an experiment for OUST. We feel we've already gained a lot from taking a "franchise approach" to our work. We still have a long way to go in building trust and expertise, and providing tools. But remembering that there are 2 million underground tanks out there that can affect 240 million Americans, we hope one day we'll be able to say "240 million customers served." □

(Brand is Director of EPA's Office of Underground Storage Tanks.)

Proposing a Global Priority: Earth Day, 1990

by Denis Hayes



Earth Day—April 22, 1970—was the largest organized demonstration in human history. An estimated 25 million Americans took part. Angry young women and men shut down 5th Avenue in New York, poured sewage on the carpets of corporate despoilers, pounded polluting automobiles apart with sledge hammers, and wore gas masks on the evening news. The U.S. Congress formally took the whole day off, as tens of thousands of schools and communities held environmental teach-ins and hosted other events across the land.

No town was too remote to be touched. No citizen was too timid or too radical, too sophisticated or too politically untutored, to find a role.

We should organize a global Earth Day, to be held the week of April 22, 1990, on the 20th anniversary of the original.

In the supercharged months that followed, the born-again environmental movement grounded the SST and passed a tough new Clean Air Act with only a handful of dissenting votes in both houses of Congress. Feeling its muscle, the movement defeated seven of a "dirty dozen" Congressmen, forced the military to halt the use of mutagenic defoliants in Southeast Asia, and helped pass a federal occupational health and safety act aimed at "in-plant pollution." On Earth Day 1970, the modern environmental movement leaped onto the national stage, grabbed the microphone, and demanded sweeping changes. The movement was, for a while, an unstoppable force. It helped to shape the values and priorities of a whole generation, and it fundamentally altered American politics.

Eighteen years now have passed since Earth Day, and much of the original vigor has faded. Environmental activists, scholars, lobbyists, and lawyers have achieved some wonderful victories during the past two decades, often against overwhelming odds. The world is a better, more healthy place than it otherwise would have been. Yet, few environmental victories can be viewed

John Sotomayor photo, The New York Times

as permanent, and too many "solutions" have been piecemeal and ineffective.

Hundreds of local, state, and federal environmental laws have been passed. Tens of thousands of pages of regulations have been issued. Millions of pages of environmental impact reports have been prepared. Huge environmental bureaucracies have been established and institutionalized. But it cannot be seriously argued that the nation, or the world, is in better shape today than it was in 1970.

The Issues

Most of the fundamental problems of 1970 still plague us. Moreover, we now face a huge array of new, complex, seemingly intractable ills: Greenhouse gases heat up the atmosphere. The ozone layer becomes thinner. Deserts expand. Rain forests shrink. Oil usage skyrockets. Solar stock portfolios plummet. Agricultural pests become resistant to modern chemistry. Garbage barges navigate the world's oceans, searching in vain for a welcoming harbor. Beaches clog with styrofoam and lethal medical waste. Aquifers fall ever lower. Ground water reeks of industrial waste. Endangered species disappear—forever—at the rate of one per hour. Human populations explode, while urban slums implode. And the image of nuclear winter, with its concomitant extinction of vertebrate life, has left its indelible mark on the public consciousness.

Viewed properly, environmental concerns are gut issues: survival issues. Homo sapiens is uniquely of this world. We are designed for it, and are inextricably linked to it. As the Earth sickens, we are afflicted. If it dies, so will we.

The greatest strength, and perhaps the greatest weakness, of the Earth Day concept lies with the multifaceted nature of our environmental problems. This complexity is a source of strength because every community on Earth has some environmental problem—e.g. toxic wastes, firewood shortages, asbestos, pesticides, dam inundation, lead paint, surfeits of garbage, or desertification—in its own backyard. Organizers can more

easily stir people to get involved in issues that affect them so directly, and which they can directly influence.

At the same time, these dozens of local issues can lead to a diffuseness that could dilute the impact of a global event. It is critically important that narrow issues are linked to broader concerns. For example, concerns over a

Viewed properly, environmental concerns are gut issues: survival issues.

local garbage dump should be linked to resources policy, recycling, and toxic wastes. People must understand that chlorofluorocarbons (CFCs), manufactured in the United States, that later escape from a junked refrigerator in Brazil, are destroying the ozone layer over Antarctica. Unless the context is carefully structured, participants and media alike may fail to communicate a coherent message.

Public Support

Public opinion polls find the average American places an extremely high value on environmental protection. Indeed, the average man-on-the-street appears to hold far stronger views than do many so-called environmental "leaders."

- Fifty-eight percent of the public thinks we spend too little on the environment; 6 percent thinks we spend too much.
- Fifth-nine percent thinks there is too little environmental regulation; 7 percent thinks there is too much.
- And—according to a New York Times/CBS Poll conducted in July 1988—65 percent of the American public believes that environmental protection standards "cannot be too high" and that environmental improvement should be made "regardless of costs." Only 22 percent disagreed with this "Earth First/Deep Ecology" sentiment. When this "cannot be too high" question was first asked in 1981, 45 percent agreed with the statement and 42 percent disagreed.

Earth Day: 1990

The time has come to galvanize a new outpouring of public support for environmental values, and to enlist a new generation of activists in the environmental struggle. Toward that end, we should organize a *global Earth Day*, to be held the week of April 22, 1990, on the 20th anniversary of the original.

The 20th anniversary of the original Earth Day provides a superb opportunity to sum up all that we have learned in the last 20 years. It provides an opportunity to explore the ecological implications of new developments, from Star Wars defense to an information-based economy. It will offer a framework in which to reexamine the wisdom of past eras, and of diverse cultures.

Earth Day 1990 offers an opportunity to reach out to new constituencies; to build alliances that transcend boundaries—reaching across countries, cultures, and continents; to carry the environmental agenda to the far corners of the planet. Recent reforms in the Soviet Union and China have left these lands more open to environmental concerns. Numerous leaders in Africa and South America have begun to resist the use of their lands as open pit mines and toxic waste dumps.

The most critical environmental issues cannot be solved by any single country acting by itself. Even where the United States is the largest single source of a problem, such as oil depletion, carbon dioxide production, or ozone-destroying emissions of CFCs, America's contribution remains only a fraction of the global problem.

Japan, for example, ranks fourth in the world in carbon dioxide emissions, but less than one-third of the Japanese public is concerned about the greenhouse effect. Japan experienced the Minimata disaster, and it suffers much of the world's worst air pollution. Japan produces 10 percent of the world's CFCs, imports a huge quantity of exotic

Throngs jammed New York's Fifth Avenue in response to Earth Day's call for regeneration of a polluted environment. View is north from 43rd Street with Central Park in the background.

hardwoods from Southeast Asia, and continues to harvest whales and dolphins with little regard for international opinion. Internationally, Japan is about to become the world's largest donor of non-military foreign aid, yet it seldom takes into careful consideration the environmental effects of the projects it funds.

Environmental concerns are viewed as having little political significance by Japan's leaders, much as they were viewed by American officials in the late 1960s. A Japanese Earth Day—organized and controlled by the Japanese and geared to address their principal concerns—could fundamentally alter both the perception and the reality of environmental politics in that country.

The most critical environmental issues cannot be solved by any single country acting by itself.

Japan's Environmental Agency recently issued a manifesto urging the nation to take a leadership position in international environmental protection commensurate with the nation's economic strength. The manifesto stated that "it is necessary to inculcate people from their childhood with knowledge and consciousness about the relationship of the environment with daily life."

Similar cases could be made for boosting emerging environmental movements in numerous other countries, including the newly industrialized countries of East Asia, much of the European Community, India, the Soviet Union, Brazil, China, and Egypt. Of course, none of these lands would countenance the United States telling them what to do on environmental issues. But the mere existence of an international Earth Day might catalyze or strengthen effective indigenous organizations in these and scores of other countries in which environmental concerns still have limited impact.

Global solutions may require global cooperation. Past international agreements, such as those governing whaling, atmospheric nuclear testing, emissions of CFCs, suggest that there exists some capacity for nations to set aside parochial concerns and act on behalf of the global commons, once an issue generates a sufficient measure of international foreboding. A global Earth Day would be designed to create a context conducive to ecological statesmanship.

The Agenda

At the core of the environmental agenda are some very basic values that seem to transcend cultures, ideologies, and politics. Aldo Leopold summarized his "land ethic" as follows:

A thing is right when it tends to preserve the integrity of the biotic community. It is wrong when it tends otherwise.... We abuse the land because we regard it as a commodity belonging to us. When we see land as a community to which we belong, we may begin to use it with love and respect.

The environmental ethic must be understood to include not just land but also the air, the water, other species, and the interrelationships between and among them all. It must assume some specific goals, including:

- A sustainable society, built upon the efficient use of renewable energy and recycled resources.



Rest in peace. Stevens Institute students, Hoboken, New Jersey, held a funeral service for the Hudson River during Earth Day activities in 1970.



Patrick A. Burns photo. The New York Times

- Human health, dignity, and freedom.
- Biological diversity.
- Peace and social justice.
- Respect for nature.

Actions should be evaluated not just in terms of their impact on this quarter's bottom line, or this year's financial statements. Rather, they must be judged on whether they are moving the world toward, or away from, these widely shared goals.

It should be possible to organize a massive worldwide event, perhaps enlisting hundreds of millions of people, in activities demonstrating widespread support for such values and objectives.

Earth Day 1990 should make it inescapably clear to the world's leaders that their "followers" are running out of patience.

If You Want To Get Involved

Earth Day 1990 is currently just an idea. If it finds fertile soil, it will take root and evolve organically. Ultimately, I would expect it to assemble a diverse international board of sponsors and largely autonomous organizations in scores of countries.

The central coordinating role might best be performed by an ad hoc group set up to catalyze the event and then dissolve. This would eliminate potential jealousies and turf wars with powerful existing environmental organizations.

If you would like to be informed as plans unfold, write to:

Earth Day 1990
P.O. Box AA
Stanford University
Stanford, California 94305 □

(Hayes, Chairman of Renew America and an attorney with Cooley, Castro, Huddleson, & Tatum in San Francisco, was the National Coordinator of Earth Day 1970.)

Earth Day 1990 should make it inescapably clear to the world's leaders that their "followers" are running out of patience.

Letter to the Editor

September 12, 1988

Editor
EPA Journal

Dear Sir:

Re: "Hatching an Environmental Battle Plan in Jacksonville" in the Cities and Environment issue of EPA Journal.

I recently read this article, authored by Khurshid Mehta and Jim Manning, and am delighted to see Jacksonville receiving its due credit for being on the leading edge of both technology and development of rules on a situation as subjective as odor. However, I would like to correct some factual misstatements in the article.

The article mentions that some physiological effects have been noted but omitted information that the Health, Welfare and Bio-Environmental Department (HWB) has that there is no relationship between odor and these physical problems. The facts are that Jacksonville is a non-attainment area for ozone, as reported by HWB (and on the EPA "bad" city list), and the preponderance of evidence suggests that these physical symptoms are due to Jacksonville's significant ozone problem.

The article also states that one of the effects of odors has been reduced property values. This is absolutely false and any research into the value of property in Jacksonville would demonstrate continuing appreciation of property in all segments of the city.

The authors state that "the odoriferous conditions are caused primarily by..." and go on to cite several sources; in fact, those sources inclusively represent less than 40 percent of the odor complaints received by HWB.

While it's true that wastewater from chemical plants does contain Total Reduced Sulfur (TRS) and terpenes, the TRS content is typically less than 20 parts per million (ppm). Collectively, the plants represent about one-half percent of the effluent sent to the city sewage plant; it's hard to accept that if 0.5 percent of the effluent has 10 ppm TRS in it that this could be a major source of odors at a sewage treatment plant, the type of facility well known for malodorous emissions.

It's true that Jacksonville now has a "standard" on odor that says that, within a 90-day period, if any five people object to any smoke, mist, dust, gas, fume, vapor, or odor from any property, that property owner is subject to a \$10,000-per-day fine. That sort of criteria is hardly an objective, technical, scientific standard. It is an opportunity for vigilantism.

The statement that inspectors obtain data about odor intensity is patently false. There is no such effort to measure odor intensity.

The statement that the law provides a regulatory mechanism that includes the development of industry-specific emission/work practice standards is also absolutely untrue.

The authors talk about many steps that pulp mills are taking on odor abatement, with the implication that these efforts are due to the new ordinance. These steps were in motion since the early 1980s and the companies had committed the funds for these projects years before the ordinance mentioned in the article was even discussed.

The authors are also inaccurate in stating that the chemical plants are the only ones in the United States using turpentine to derive terpenes. There are a number of other plants in the United States including two in Florida and two in Brunswick, Georgia, 60 miles from Jacksonville.

Glidco is proud that one year before the ordinance became law (and months before the current Mayor was elected), we had volunteered with the Mayor's office to establish a specific program of identifying and implementing projects designed to eliminate/reduce malodorous emissions.

I can only assume that this article was written sometime before it was published because the odor measurement approaches described by the authors have proven to be technically unsound and practically unusable.

Jacksonville is, indeed, the Bold New City of the South and has made tremendous strides in abating odors. As a proud corporate citizen here for the last 78 years, SCM Glidco is delighted to have helped our city achieve its potential as an "all American city."

Sincerely yours,

George W. Robbins
President
SCM Glidco
Jacksonville, Florida

The authors respond:

To the Editor:

The comments in Mr. George Robbins' letter of September 12 were brought to the attention of and reviewed by the Bio-Environmental Services Division of the City of Jacksonville. The authors continue to stand behind the veracity of the information presented in the article. In view of the fact that the technical issues raised in Mr. Robbins' letter have been addressed in the past at public meetings, the authors decline to make any further comment.

Signed,

Khurshid K. Mehta
James L. Manning

Letters to the editor are published at the discretion of EPA Journal, which reserves the right to edit them for clarity or brevity. As with other articles in the Journal, letters express the opinions of the authors, and do not necessarily reflect EPA policy. The Journal invites readers to send letters and appreciates the time and effort that go into them. Letters become the property of EPA Journal and will not be returned.

Appointments



Alexandra B. Smith has been appointed Associate Regional Administrator in Region 4, Atlanta. Previously she was Deputy Regional Administrator in Region 8, Denver, a post she held from July 1984 to August 1988. Smith came to Denver from Region 10, Seattle, where she had directed the Air and Waste Management Division since 1978.

Between 1977 and 1979, she was Chief of the Environmental Evaluation Branch in Region 10, and prior to that she directed the Region's Office of Federal Affairs. Smith began her government career in 1972 at the Department of Housing and Urban Development, where she was an employee development specialist. She also worked briefly for the National Park Service in Harpers Ferry. Before joining government service she worked for private companies in both Colorado and New York and television stations in New York and Seattle.

Smith received her bachelor of arts degree in government from St. Lawrence University in 1967, her master's degree from Syracuse University in 1968, and an M.B.A. from the University of Washington in 1982. She received the Gold Medal for Exceptional Service in 1980, Bronze Medal in 1982, and in 1987 was the recipient of a Senior Executive Service Presidential rank award.



Jonathan Z. Cannon has been appointed Deputy Assistant Administrator of the Office of Solid Waste and Emergency Response (OSWER).

Cannon graduated *summa cum laude* from Williams College and *cum laude* from the University of Pennsylvania Law School. After clerking for Judge David Bazelon on the U.S. Court of Appeals for the District of Columbia Circuit, he joined the law firm of Beveridge and Diamond. He was a partner in the firm from 1980 to 1986, when he left to join EPA.

In January 1987, Cannon was named EPA Deputy General Counsel for Litigation and Regional Operations. In August 1987 he became Deputy Assistant Administrator for Civil Enforcement in the EPA Office of Enforcement and Compliance Monitoring, which post he held until joining OSWER.

Cannon is a member of the D.C. Bar and the Natural Resources Section of the American Bar Association. He has been an Adjunct Professor of Environmental Law at Washington and Lee and a lecturer on the subject at the University of Virginia Law School.



Edward E. Reich has been named Deputy Assistant Administrator for Civil Enforcement in the Office of Enforcement and Compliance Monitoring. Prior to this appointment, Reich served as Associate Enforcement Counsel for Waste in that office.

A graduate of Queens College, City University of New York, with a subsequent law degree from the Georgetown University Law Center, Reich joined EPA at its inception in 1970 as a program advisor in the Office of Air Programs. He moved shortly thereafter to the Office of Enforcement and General Counsel. In early 1972 he became Chief of that office's Enforcement Proceedings Branch, a position he held until March 1974, when he left the Agency to become deputy general counsel for Petroleum International Associates.

Reich returned to EPA in 1975 as Chief of the Enforcement Proceedings Branch in the Office of Enforcement. In 1976 he became Director of the Stationary Source Compliance Division in the Office of Air and Radiation, a post he held until late 1986, when he joined the Office of Enforcement and Compliance Monitoring as Associate Enforcement Counsel.



Jack W. McGraw is the new Deputy Regional Manager in Region 8, Denver, a post he assumes after five years as Deputy Assistant Administrator for the Office of Solid Waste and Emergency Response. From January to August 1985, McGraw was Acting Assistant Administrator for that office.

McGraw, who holds a bachelor's degree from the University of Charleston in West Virginia and a post-graduate degree from Texas Christian University, joined the federal government in 1972 after service as a minister and president of the Community and Housing Development Corporation. In 1972 he became director of the Housing Recovery Office at the Department of Housing and Urban Development (HUD), and in late 1975 became Chief of the Preparedness Division for the Federal Disaster Assistance Administration in HUD. Subsequently he held a number of posts in the Federal Emergency Management Agency and was that agency's deputy director for Emergency Operations prior to joining EPA as Deputy Assistant Administrator for Solid Waste and Emergency Response in mid-1983.

Among McGraw's assignments in the emergency response field were planning and coordinating response

activities in major disasters such as those following Tropical Storm Agnes and the Buffalo Creek floods in 1972 and participation on interagency or White House task forces involving the fall of the Russian Skylab satellite, drought problems, the energy problem, and Love Canal.

Dr. Raymond Loehr, a professor of civil engineering at the University of Texas at Austin, has been named Chairman through 1990 of the EPA Science Advisory Board (SAB). He succeeds Dr. Norton Nelson of the New York University Medical Center.

Dr. Loehr first became associated with EPA in 1974 as a Program Advisor for the Effluent Guidelines Division. His participation on various SAB committees and subcommittees began in 1976. Dr. Loehr has chaired the Technology Assessment and Pollution and Control Advisory Committee, the Hazard Ranking System Review Committee, the Risk Reduction Workgroup of the Research Strategies Subcommittee, and the Environmental Engineering Committee, and is a member of the SAB Executive Committee.

A professional engineer, Dr. Loehr earned his bachelor of science degree in Civil Engineering and a master of science in Sanitary Engineering at the Case Institute of Technology, and a doctorate in Sanitary Engineering at the University of Wisconsin. He taught at Case Institute, the University of Kansas, and Cornell before joining the faculty of the University of Texas, where he holds the Hussein M. Alharthy Centennial Chair in Civil Engineering.

He has been active on a number of committees of the

National Academy of Sciences, National Academy of Engineering, and National Research Council, the International Joint Commission, the University of Illinois Advanced Environmental Control Technology Research Center, the United Nations Food and Agricultural Organization, and Cornell University. He is a member of the American Academy of Environmental Engineers, the Water Pollution Control Federation, the American Society of Civil Engineers, the Association of Environmental Engineering Professors, the American Association for the Advancement of Science, and the Society of Environmental Toxicology and Chemistry.

Dr. Loehr has written extensively. He has authored, co-authored, or edited eight books on agricultural waste management practices and over 160 technical publications and reports relating to municipal and industrial waste management. He is currently on the editorial board of *Hazardous Waste and Hazardous Materials* and has been an editor of other technical journals. He has served as a consultant to numerous industries, trade associations, consulting firms, and government agencies.

(Dr. Loehr's photograph is with the feature earlier in this issue in which he authors an article.)



Anna Hopkins Virbick has been named EPA's Acting Deputy Inspector General. Previously, she was an Assistant Inspector General for Management and Technical Assessment.

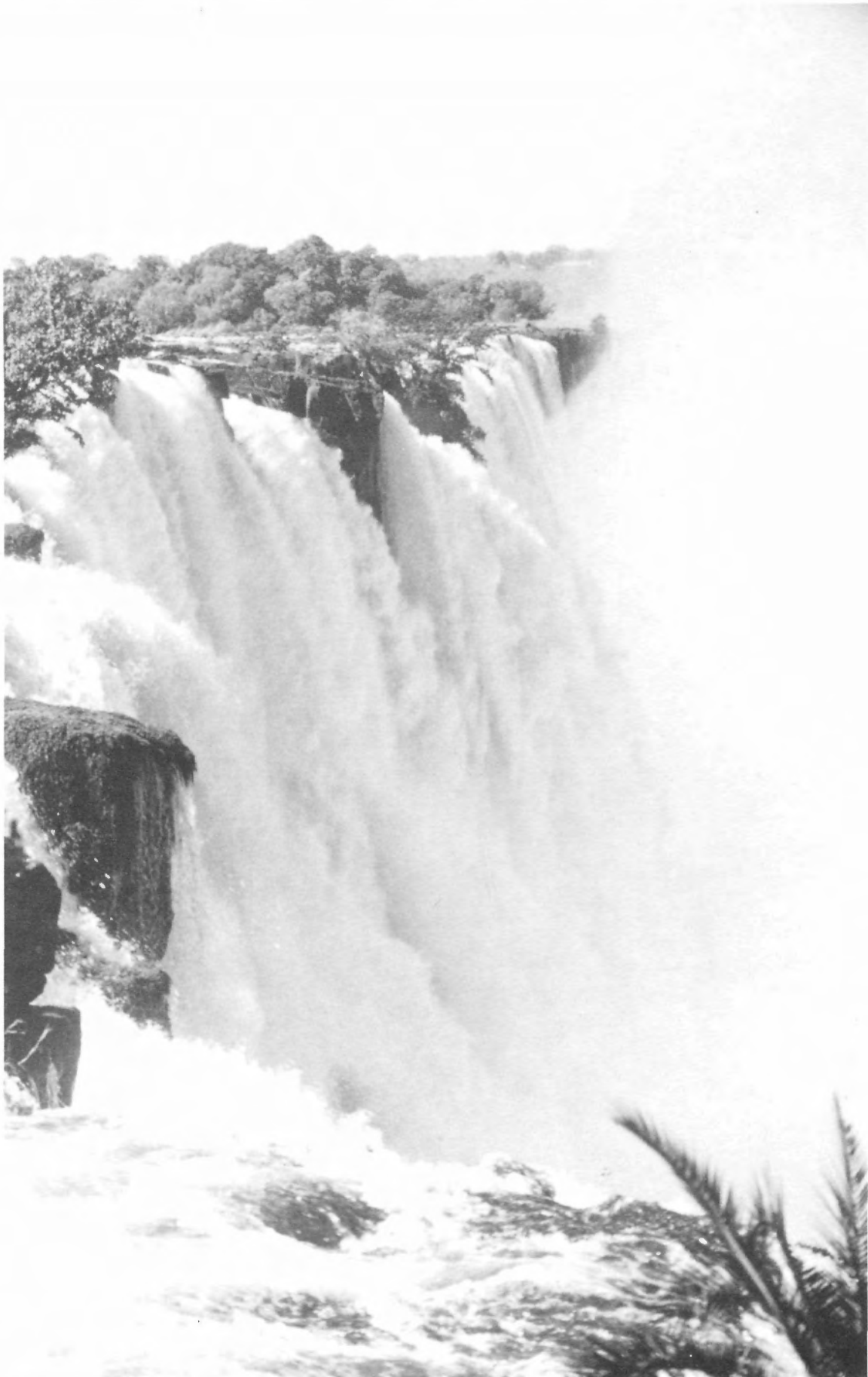
Virbick joined the federal government as an Auditor in the Civil Division of the General Accounting Office in 1965, after earning her bachelor's degree in Business Administration at Wesleyan College. Later she earned a master's degree in Public Administration at American University and another master's degree in Education from Marymount University.

She became a Supervisory Auditor in the General Government Division of GAO in 1967, moving in mid-1976 to the Department of Housing and Urban Development, where she was Director of Field Audit Operations, Community Planning and Development, and GAO Liaison in the Office of Audit. In 1983, she joined EPA as Director of the Technical Services Staff in the Office of the Inspector General.



Michael S. Alushin, an Associate Enforcement Counsel for Air Programs, is one of six federal managers selected as charter members in the Senior Executive Service's (SES) new fellowship program. The program was created by the Office of Personnel Management (OPM) to provide SES members with an opportunity to travel, write, lecture, and do research.

Alushin will spend a year concentrating on international environmental issues, working with a public-interest group, a multi-national organization, and the Department of State. According to OPM director Constance Horner, the program was designed to "recognize and reward career members of the SES who have made significant contributions to the development of their employees," and who "now deserve the opportunity to develop further their own managerial and intellectual resources." □



Victoria Falls, Zambia.
It's a big earth. What
is its breaking point
from environmental
abuse?