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a product, economic dislocation would be far less than it would be after major commercial investment and a labor force were committed to production of the product. Supporters also cite the disastrous effects toxic chemical pollution has often had on such small businesses as fisheries, food processing and tourism.

EPA and CEQ spokesmen testified that dangers such as those posed by PCBs, fluorocarbons and vinyl chloride could be dealt with or even averted if toxic substances controls were in effect. Speaking of EPA's efforts to eliminate the PCB problem, EPA Administrator Train noted that without a toxic substances control act "again and again we find ourselves engaged in an extremely difficult and drawn-out struggle to protect the public from a hazard to which it has already been exposed while at the same time trying to avoid putting people out of business or out of work."

THOSE OPPOSED...

The chemical industry's reaction to toxic substances control bills has been divided--some companies contend that any regulation is unnecessary because new chemicals are already being extensively tested voluntarily and harmful substances are already covered by existing laws; other firms and trade associations accept the legislation in principle but view the pending bills as "extreme." The latter group has supported versions that would limit EPA's authority and would exclude several categories of chemicals from coverage.

The Manufacturing Chemists Association (MCA), a trade group representing 90 percent of the chemical industry, holds that bills such as those now before the House and Senate Commerce Committees "would be counterproductive, contribute to inflation, delay the introduction of new products, and result in the loss of thousands of jobs."

If a toxic substances bill is to be passed, MCA holds its key provisions should:

- require pre-market notification only for substances EPA has included in a list of chemicals likely to pose a substantial unreasonable risk.
- allow EPA to require testing only of substances known to present an unreasonable risk.
- permit EPA to use its toxic substances regulatory authority only as a last resort if no other law could be used.
- limit the information manufacturers would have to provide EPA and exempt more of it from disclosure as trade secrets.
- eliminate citizen suit and petition provisions.
- require EPA to prepare an economic impact statement before regulating a chemical's manufacture or use.

THE COST FACTOR

The MCA's assertion that a more stringent law would cause inflation and unemployment is based in part on a consulting firm's 1975 study. It estimated that annual costs to the chemical industry of testing, reporting and delaying introduction of chemicals would be between $350 and $1300 million. A separate study by the Dow Chemical Company placed annual costs at $2 billion. An EPA study of compliance costs predicted expenditures of $80 to $140 million a year.

Congress's General Accounting Office analyzed the conflicting studies and concluded that industry had overestimated the costs of compliance. The GAO study called EPA's figures "most reliable," although understated in some respects. GAO estimated that industry would have to spend between $100 and $200 million per year to comply with a stringent toxic substances law.

GAO further pointed out that none of the cost studies had considered the benefits of chemical regulation, particularly in cases where chemicals are found to be dangerous. "Whatever costs might be," GAO said, "the benefits might still exceed the costs."

BASIS FOR DECISION

Cost may be a significant factor in ultimate enactment of toxic substances control legislation. Many congressmen and the President are concerned about the cost to business of government regulation. In a period of economic problems, they may be particularly receptive to industry's warnings that a strong bill might contribute to the nation's inflation and unemployment.

With growing public awareness of the dangers posed by exposure to chemicals once thought harmless, Congress and the President may view the benefits of strong toxic substances control legislation as outweighing the financial costs. They may in 1976 agree with the conclusion drawn by the Council on Environmental Quality in 1971: "The time has come for an action program to control toxic substances."

RECOMMENDED READING

Toxic Substances. 25 pp. 40¢. From Sup't of Documents, US GPO, Washington, D.C. 20402. Stock No. 411-004. 1971 CEQ overview of problem and case for comprehensive new legal approach.

A Comparison of Three Estimates of Costs of the Proposed Toxic Substances Control Act. Economic analysis staff of U.S. General Accounting Office, 16 pp. Single copies free from Office of Program Analysis, Rm. 5007, Arthur Bldg., 441 G St., N.W., Washington, D.C. 20548.

Environmental UPDATES:

Controlling Hazardous Pollutants: In the Ocean. 4 pp. 25¢. LWVEF Pub. No. 571, April 1975. And Controlling Hazardous Pollutants: In Inland Waters. 4 pp. 25¢. LWVEF Pub. No. 591, June 1975. Both available from LWVUS Pub. Sales Dept., 1730 M St., N.W., Washington, D.C. 20036.

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environmental UPDATE on toxic substances

Pub. No. 644 February 1976

ARE NEW CONTROLS NEEDED?

Despite a proliferation of environmental laws over the past five years, our newspapers are filled with dramatic stories of chemicals suspected of endangering our health. We can hardly escape a growing awareness of the many substances that became part of our daily lives and only belatedly were discovered to be hazardous.

We read that the fluorocarbons propelling our aerosol sprays may be increasing the incidence of skin cancer by destroying the earth's protective ozone layer. Vinyl chloride, today's most commonly used plastic, has caused deaths from liver cancer of over 20 workers at plastics factories.

Our food, milk, and water have been contaminated with PCBs (polychlorinated biphenyls), and PCB concentrations in the environment, particularly in fish, have been increasing. Released in the manufacture and disposal of such products as power-generating equipment, printing inks and paints, these compounds are even more persistent than DDT. It is estimated that PCBs are now in the tissues of about half the American people. And these chemicals have been found to cause liver tumors in animals, and miscarriages, birth defects and skin disorders in humans.

More and more people are asking why such hazardous chemicals can't be controlled. To a limited extent existing laws do mandate some regulation of selected harmful chemicals. But has this been sufficient?

There have been serious problems in implementing available controls. Moreover, several substances now recognized as threatening human health and the environment are not regulated by any current law. Most significantly, there is now no legal requirement to test most chemicals to learn--before their widespread production and use--whether or not they are dangerous.

WHAT CONTROLS ARE AVAILABLE?

A variety of laws administered by a number of federal agencies reflect the government's recognition of the serious risks posed by toxic substances. These laws mandate controls over:

- pollutant discharges,
- human exposure to chemicals, or
- manufacture or distribution of certain substances.

Pollutant controls The 1970 Clean Air Act and 1972 Water Pollution Control Act authorize the Environmental Protection Agency (EPA) to set standards limiting discharge of pollutants endangering life or health. In the five years since passage of the Clean Air Act, standards have been set for only three hazardous pollutants--asbestos, mercury and beryllium--and were recently proposed for vinyl chloride.

Although EPA has listed nine chemicals and their compounds as toxic water pollutants--including mercury, PCBs and several pesticides--it has failed to establish a single standard limiting their discharge. A more complete discussion of the delay in implementing these toxic pollutant controls can be found in the UPDATE Controlling Hazardous Pollutants: In Inland Waters.

The 1972 Marine Protection, Research and Sanctuaries Act prohibits or regulates dumping at sea of any substance "which would adversely affect human health...or the marine environment." Mercury, PCBs, arsenic and many pesticides are among the waste constituents whose ocean dumping is now regulated. Further information about this system of limiting disposal of dangerous chemicals is available in the UPDATE Controlling Hazardous Pollutants: In the Ocean.

There is little direct federal control over hazardous waste disposal on land, whether by industry or by consumers discarding products after use. However, the underground drinking water protection provisions of the 1974 Safe Drinking Water Act should result in some restrictions on

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waste disposal practices that endanger groundwater supplies.

Exposure controls The Safe Drinking Water Act attempts to prevent contaminants harmful to health from reaching humans after their discharge into the environment. Interim drinking water standards applicable to some 40,000 community water systems have now been established by EPA for such chemicals as arsenic, cadmium and mercury.

EPA has chosen not to set standards for organic chemicals in drinking water until further studies of their dangers and of monitoring and treatment techniques have been completed. However, several EPA studies already have demonstrated that organic chemicals are widespread in the nation's drinking water; several of these compounds are known to cause cancer in animals, though their effects on humans are not yet proven.

Our current approach to toxic substances creates a problem evident in treating drinking water. Chemicals harmful to health can be freely used in industrial processes and then, as wastes, be discharged into waterways. Downstream communities must then pay the costs of removing such chemicals from their drinking water.

The Department of Labor--under the 1970 Occupational Safety and Health Act--can establish and enforce standards to limit exposure to hazardous substances in the workplace. Limits have been set on vinyl chloride, asbestos, and a number of carcinogenic industrial compounds.

Production controls In addition to control of discharges and exposure, the government also has some authority over production and distribution of certain substances. These point-of-manufacture controls apply to pesticides, food additives, drugs, and radioactive materials.

The Consumer Product Safety Commission has authority under the 1972 Consumer Product Safety Act and the Federal Hazardous Substances Act to ban or require labeling of hazardous substances sold for use in the household; it can control known hazards of consumer products already on the market and not subject to regulation under other statutes.

GAPS IN CONTROL AUTHORITY

In 1970, the President's Council on Environmental Quality (CEQ) studied the problem of our increasing exposure to potentially toxic substances. Its report, published in 1971, pinpointed the shortcomings of existing government controls over chemicals endangering health and the environment--shortcomings which still exist.

While noting that controls over manufacture and distribution can be very effective, CEQ observed that such powers "cover only a small portion of the total number of potentially toxic substances and do not deal with all uses of a substance which may produce toxic effects."

CEQ cited several factors reducing the effectiveness of pollutant and exposure limitations:

- Water and air pollution standards are mainly concerned with pollutants which occur in large quantities.
- Technology to completely eliminate discharges of many toxic pollutants is often unavailable.
- There is a serious lack of advance information about the environmental or health effects of the rapidly increasing number of chemicals produced each year. Testing has largely focused on acute effects rather than chronic, long-term effects. Yet induction of cancer, genetic mutations or birth defects can generally be detected only through studies of extended exposure to small quantities. "In general," the report notes, "we do not know which chemicals cause such effects or the levels that a given chemical must reach before the effects occur."
- Problems in proving adverse chronic health effects of substances on which manufacturers and consumers have become dependent make it difficult to establish defensible regulations.
- The most significant problem is the failure of existing controls to consider the environment's and population's total exposure to any given substance. Most toxic substances are present in varying quantities in air, water, soil, industrial and consumer products. No one agency is completely responsible for all toxic substances in the total environment, so information about all forms of discharge and all effects discovered is not centrally collected or utilized.

TO FILL THE GAPS

CEQ concluded that the toxic substances problem required a systematic, comprehensive approach--one that considers the flow of these chemicals through "the entire range of activity--from extraction to production to consumer use and to disposal."

This could best be achieved, said the Council, through a Toxic Substances Control Act giving EPA authority to:

- require testing of new chemical compounds or new uses
- gather information about chemical production and uses and results of tests made on effects
- control production, distribution or use of any chemical harmful to health or the environment.

The Council urged prompt action to protect health and the environment, declaring that

> *we need no longer remain in a purely reactive posture with respect to toxic substances. We should no longer be limited to repairing the damage after it has been done; nor should we continue to allow the entire population or the entire environment to be used as a laboratory.*

In response, the Administration introduced toxic substances control bills providing mechanisms to determine what substances enter the environment, to assess effects, and to control those found harmful.

Both houses passed toxic substances legislation in 1972, but were unable to resolve major differences about how much regulation to require. In 1973, the House and Senate again passed different versions and again failed to agree on an acceptable compromise.

AS 1976 BEGINS

House and Senate toxic substances control bills were again introduced in 1975. The House bill, H.R. 10318, was approved by the Consumer Protection and Finance Subcommittee and is awaiting consideration by the full Interstate and Foreign Commerce Committee. In mid-February 1976, the Senate Commerce Committee reported a clean bill to the full Senate. The two measures are far closer on key points than past versions.

The House and Senate bills establish a national policy giving manufacturers the responsibility for testing chemical substances for their environmental and health effects. Both bills declare that chemical substances posing an unreasonable risk should be regulated but that regulatory authority should not impede technological innovation.

Requirements of neither bill would apply to pesticides, food, drugs, or radioactive materials, because these substances are already subject to point-of-manufacture regulation.

While the precise language differs, both bills include six key features:

1) Testing--if EPA determines a new or existing chemical may cause or contribute to an unreasonable risk to health or the environment and that testing would help determine or predict that risk, it may require the manufacturer to test the substance. In addition, if there is or will be substantial human or environmental exposure to a chemical and there is inadequate information to predict its risk, EPA can require testing.

A priority list for testing would be developed by an interagency committee. Testing could also be required for substances not on that list.

2) Pre-market notification--ninety days before a manufacturer could produce a new chemical or an existing chemical for a "significant new use," he would have to notify EPA of his intent to do so. If testing of that substance had been required, test data would have to be submitted at the time of notification. In some instances if no testing had been required, the company would have to submit data showing that the substance would not pose an unreasonable risk in the course of manufacture, use or disposal.

If EPA needed more time to study the information submitted, it could extend the notice period an additional 90 days.

3) Regulation--EPA would have authority to prohibit or limit the manufacture, distribution or use of any new or existing substance that causes or contributes to an unreasonable health or environmental risk. The agency could also set labeling requirements and regulate disposal methods.

To protect the public from an imminent hazard, EPA could take immediate action, either through the courts or by making its rules effective immediately.

4) Information reporting--Chemical manufacturers would be required to provide EPA with information about the substances they produce: identity, quantities, uses, number of workers exposed, and any known adverse effects. Trade secrets would be protected from disclosure.

A manufacturer with information indicating that a substance poses an unreasonable health risk would be required to inform EPA immediately.

5) Citizen suits and petitions--Any person could bring suit against a manufacturer for a violation of the act or against EPA for a failure to perform its mandated responsibilities. Court costs may be awarded to any party.

Anyone could petition EPA to issue a rule requiring testing or regulation of a chemical. If EPA refused to act, the petitioner could go to court to show that failure to issue such a rule could result in an unreasonable risk; the court could then order EPA to consider the necessity for regulation.

6) Relationship to other laws--EPA could use its regulatory authority under this act rather than under another law it administers if the risk could be more effectively reduced or prevented under this act.

If EPA concluded that an unreasonable risk could be prevented or reduced under a law administered by another agency, it would ask that agency to act. If the agency decided there was no risk or it acted to deal with it, EPA could take no regulatory action.

THOSE IN FAVOR...

The pending bills are strongly supported by health, consumer, and environmental groups and by organized labor. While testimony by representatives of EPA and CEQ during the 1975 House and Senate hearings indicated Administration support, the Office of Management and Budget has more recently expressed its support of a version less restrictive to industry.

Supporters emphasize the public health benefits of determining hazards before widespread human exposure to chemicals. Noting that many of the diseases induced by chemicals do not become evident for 20 years or more, they cite the danger of having large segments of the population exposed for so long before regulatory actions are possible under existing laws.

They point out that if regulatory action were taken before manufacture and distribution of

implication, the burden of proof most often lies with those opposing the continued use of a substance rather than with those who profit from its use. Consequently, a potentially harmful substance can get into the marketplace and the environment, and stay there, while opponents try to prove its unsafe character.

Ethical considerations

Should policy makers be evaluating risks for the public? Determining a threshold of a hazardous substance that will protect the especially vulnerable as well as the average populace is a nearly impossible task. Each person has a different threshold, depending on such factors as the person's age, individual diet, state of health and even mental health. The setting of standards, then, becomes an ethical dilemma—one for which science has no solution. Perhaps the solution will depend on restructuring value systems to take the entire ecosystem into account.

How safe is safe enough?

Acceptable risk must be defined in terms of the population at risk to very low levels. If cancer is the risk, then the risk must be reduced to as low a level as possible without bankrupting the nation.

Delbert Barth, Deputy Assistant Administrator for Health and Ecological Effects, EPA

An acceptable risk is one which is a small fraction of the natural background level; does not cause long-term changes; and can be quickly reversed, if necessary. It is not an economic concept, but rather a question of scientific judgment, which is usually based on inadequate data.

Rep. George E. Brown, Jr. (D-Calif.), Chairman, Subcommittee on Environment and the Atmosphere

There is no question, we'll have to accept some degree of chemical risk. But let's do it in the most knowledgeable way possible—not for chemicals that have no particular utility. Let's save the risk for a critical food preservative, a drug, or the effluent from a critical power source.

David P. Rall, Director, National Institute of Environmental Health Sciences

Government sets the standards in such matters. The standards can and do change because they are based on the best scientific and technological data available at any given time.

William J. Driver, President, Manufacturing Chemists Association*

These quotes reflect many of the concepts, issues and problems related to health risk assessments and safety judgments—costs of research and controls, lost economic opportunities, insufficient and changing data, and recognition that absolute safe levels do not exist. Safety issues will always provoke controversy because there are so many unknown factors as well as so many different points of view. Decisions to limit products and determine acceptable levels for pollutants, however, must continue, using whatever information is available at a given time. We must recognize that all evaluations of potentially hazardous products should be provisional and that any regulatory program should include regular reporting of quantities and patterns of use, periodic reevaluation of risks and benefits, and appropriate regulatory changes.

How safe is safe enough is more of a social question than a scientific one. There are few things of more concern to men and women than their health and those factors that affect it. This concern dictates the necessity for people to be kept well informed of all sides of the safety issues at question. We do not need a degree in science to hold and express deep convictions on the degree of risk or uncertainty that we will accept from potentially dangerous products and other substances or how much we are willing to pay in order to reduce the risk. This should always remain a subject of intense public scrutiny and debate.

Some sources you may want to read

Lowrance, William W., *Of Acceptable Risk,* William Kaufmann, Inc., Los Altos, California: 1976.

National Academy of Sciences, *Decision Making for Regulating Chemicals in the Environment,* Washington: 1975.

National Academy of Sciences, *Principles for Evaluating Chemicals in the Environment,* Washington: 1975.

*(These views were taken from "Environmental Cancers: Humans as the Experimental Model?" by Lois Ember in *Environmental Science & Technology,* vol. 10, Number 13, December 1976.)

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Of Mice and Men: Health Risks and Safety Judgments

People have a natural desire to minimize personal risks. Estimating, evaluating and reducing our risks, however, has been made vastly more difficult because of rapid and complex technological advances that permit widespread use of new products faster than we can learn about their consequences. Merely keeping abreast of the risks of existing substances and their byproducts is a full-time task.

Our society increasingly relies on scientific wizardry to determine potential hazards and on environmental and consumer laws and regulations to protect the "public health and welfare." The growing body of federal legislation calling for risk assessment and standard-setting includes the Federal Food, Drug and Cosmetic Act, the 1970 Clean Air Act, the 1970 Occupational Safety and Health Act, the Federal Insecticide, Fungicide, and Rodenticide Act, the 1972 Federal Water Pollution Control Act Amendments, the 1974 Safe Drinking Water Act, the Toxic Substances Control Act and the Resource Conservation and Recovery Act.

Numerous regulatory agencies, acting as our surrogates, weigh risks and benefits in order to establish "safe" standards for everything from the places we work to the air we breathe, the water we drink and the food we eat. In other words, they determine what risks are acceptable to the general public. And we, the public, assume we are safe—at least until the next catastrophe hits the morning newspaper.

What do these standards represent? The fact that standards exist does not mean that they are met; the fact that standards are met does not mean that they are sufficiently stringent.

The setting and meeting of standards involves value judgments as well as scientific facts. In debates on the hazards of cyclamates, radiation from X-rays, PCBs, drinking water chlorination, and DDT, for example, how does one combine the objective and scientific with the political and subjective? How does anyone or any agency judge the risks to which the public may be exposed? These are questions that involve both how health risks are assessed and communicated and how safety is judged and achieved.

The difference between risk and safety

An appreciation of the distinction between *risk* and *safety* is essential to the understanding of environmental standard-setting. Risk is the probability that something (undesirable) will happen. Risk measurement draws upon scientific understanding of the relationship between exposure and effect and, although it cannot predict specific events, makes statistical projections about the frequency with which an event will occur in the future.

Safety, on the other hand, is a policy issue that involves the weighing of properly identified risks and benefits. The word "safe" can have different meanings for different people. Most of us believe in the dictionary definition that safe means "freed from risk or harm." But in real life, absolute safety does not exist.

Hazards and their attendant risks change as do people's values and expectations. For example, because most infectious diseases, such as typhoid and cholera, have been conquered, most people now perceive cancer to be the paramount health hazard. One constant fact of life, however, is that human activity will always and unavoidably involve risks. Therefore, some degree of risk must be considered acceptable to society. The catch is that risk and degrees of risk, as well as safety and degrees of safety, evolve according to individual perceptions and personal and social standards of acceptability.

As William Lowrance succinctly puts it in his book, *Of Acceptable Risk,* "a thing is safe if its risks are judged to be acceptable." He goes on to state that this definition implies two separate activities for determining how safe things are: (1) the task of objectively measuring risks, and (2) the task of subjectively judging whether those risks are acceptable (judging safety).

It should be pointed out, though, that measuring risks and judging safety are imprecise and uncertain tasks. Variations in the behavior and effects of chemicals are virtually limitless; we cannot develop a scientifically adequate data base and test procedures to demonstrate whether every substance is hazardous or can be controlled within existing or modifiable circumstances. Therefore, the task of measuring risks is not as objective as we would like because of the many assumptions and extrapolations that have to be made.

Measuring health risks

Any determination of risk must take into account the *toxicity* (defined as the capacity to produce injury) of a substance and the level and means of exposure. Tracing the usage and disposal patterns of a substance requires an examination of its movement in different media (air, water, soil), its transformation in such media, and dissemination of any altered compounds. The action of a particular substance can be changed by its exposure to other substances. In some instances, chemical alteration will lead to loss

facts & issues

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of toxicity, while in others, it will produce more toxic forms.

The length of time over which a substance interacts with a person and the quantity of the substance present together determine the level of exposure. For the toxicologist, the integration of quantity and time for action is reflected in the term *dose*. If a relatively large amount of a chemical acts over a short period of time, acute (immediate and conspicuous) effects may occur. Examples of acute effects are dead trees around smelters or respiratory ailments accompanying severe air pollution.

If, however, relatively smaller quantities of a chemical act over a longer period of time, perhaps twenty or thirty years, chronic effects may occur. These effects, such as lead poisoning from pipes carrying drinking water from highly corrosive water supply systems, are difficult to detect because the relation between cause and effect is less apparent.

The limitations of testing procedures

The oldest, most traditional form of testing to quantify health effects involves a determination of the *lethal, median lethal,* and *no effect* doses of a substance. First, the amount of the material (measured in weight as a proportion of the weight of the test animal) that kills all of the test population in a certain time is determined. Then the dose is reduced until an exposure level is found that kills half the test population (median lethal dose). Finally, testing is continued by slowly reducing the dose until the entire test population shows no adverse effects. The "safe" dose of a substance for humans is calculated from the maximum exposure level in experimental animals that produces no detected adverse effects. Usually, a safety factor is included by setting the "safe" human dose at some fraction, perhaps 1/10 or 1/100, of the maximum safe exposure level to the test population.

This type of testing, however, is only adequate for short-term exposure or acute effects of substances. Testing for chronic, low-level effects is much more difficult, because of the multitude of possible effects, low incidence of some effects, and the delay in response.

Take, as an example, an additive or drug that produces cancer or birth defects in one of every 10,000 rats or mice. For statistical significance, 30,000 rats or mice would have to be tested. In practice, only 30 to 50 animals are generally used in a test group, largely because of cost constraints on research. Therefore, if animals are tested with levels at which humans are exposed, chances of detecting chronic, low-level effects are virtually nil.

The major technique to overcome the low-effect, time-delay problem that would make testing for chronic effects of low-level exposures impossible is to greatly increase the dosage. This means that doses well above the likely levels of human or wildlife exposures are applied in order to reduce the time required to produce a tumor or cancer. Once a tumor or cancer is produced, the dose is then reduced in successive levels in a search for some dose that will produce very minimal effects. Many scientists believe that for carcinogens (cancer-causing or -promoting agents), there is no dose other than zero that will not produce an effect.

A margin of safety must be incorporated in the permissible dose to compensate for the degree of uncertainty in determining that dose. The less precise the determination of hazard, the larger must be the margin of safety.

These test procedures for detecting chronic effects are cumbersome, elaborate, time-consuming and costly. To test one chemical for carcinogenicity takes two to three years and costs about $100,000. There is, accordingly, an eagerness to find "quickie" tests, short cuts that would save both time and money. The bacterial Ames test, for example, is a "quickie" test that relates mutagenic (gene-changing) effects and carcinogenic properties of chemicals. While it is widely heralded as a screening device, no one is yet sure how reliable a predictor it is.

From mice to men

The task of analyzing risks would be made much simpler and more reliable if human toxicologic information were used. However, data on human responses to environmental hazards is limited, except for information on unique exposures occurring accidentally. Experimental exposures of man to toxic or potentially toxic substances are also severely limited by ethical considerations. Applying the results of laboratory testing to the general public, then, involves the extrapolation of results of animal experiments to predict the effects on humans.

Generally, the choice of a species for tests depends on the biological similarity of its responses to substances under study and on its physiological likeness to man. Since economic considerations also govern the choice, rats or mice are most often used. While tests with these animals are useful for preliminary screenings, experts say they should be succeeded by tests with other animals before a material is approved for human use.

The Council on Environmental Quality states in its sixth annual report that empirical evidence shows that animal tests can be validly applied to humans. "Not only have rodent experiments given positive carcinogenic test results for compounds known to cause cancer in man, but also—in every case except arsenic—each chemical known to cause cancer in man has been found to do so in animal species."

There are problems associated with animal extrapolation, however. These are capsuled in this sentence from a National Academy of Sciences (NAS) publication: "It has been repeatedly shown that no one species (including nonhuman primates) has responses parallel to the human over a wide range of the effects of chemicals." Thus, a positive finding in animals does not necessarily indicate that a chemical is harmful to people. Conversely, a negative finding in animals does not necessarily indicate that a chemical is harmless to humans.

For these reasons, scientists question the validity of extrapolating animal data to humans. In any event, there is a need for more animal testing, particularly of chronic effects, since most carcinogens have been identified through human exposure rather than through testing.

The issue of thresholds

The concept of threshold values—some concentration below which a substance has no measurable adverse effects—has provoked considerable controversy among scientists and policy makers and confusion in minds of the public about the establishment of safety levels. Is there a threshold below which no toxic effects are seen or does the probability of adverse effects simply become smaller as the dosage is lowered to zero? If the former is true, it would be possible to establish a standard, lower than some no-effect point, that would provide a high level of assurance that no harm would come to the exposed population. If the latter is true, however, some portion of the public would always be affected—though the effects may be small—as long as there is a standard that permitted a dose greater than zero. Deciding on a policy that can adequately deal with this uncertainty is the crux of the threshold issue.

To complicate the matter, some substances appear to have thresholds while others do not. Substances that cause irreversible effects, such as cancer or mutation, generally do not seem to have an effective threshold but instead, show a decreasing likelihood of causing adverse effects. Yet if only one cancer or chronic disease results, personal cost is high.

Because of these uncertainties, laws are based on what is an acceptable risk rather than on whether there is absolute safety below a certain threshold. The Clean Air Act of 1970 is based on this threshold concept. Congress directed the Environmental Protection Agency (EPA) to determine on the basis of medical evidence the maximum allowable level for major air pollutants (sulfur dioxide, carbon monoxide, nitrogen oxides, particulates and oxidants), incorporating an adequate margin of safety, that would protect public health. The level or value for each pollutant is defined as the national primary air quality standard.

Seven years later, EPA is in the process of reevaluating the scientific criteria upon which the national air quality standards are based. Because of new and more substantive information collected since 1970, some observers feel that those threshold values provide insufficient protection for public health, while others feel the thresholds are too restrictive. Since accepted threshold levels may change over time as measurement methods improve, many think that the concept is misleading. Whatever the case, the issue of thresholds is of major importance in the safety evaluation of potential environmental hazards.

Communicating risks

Most expressions of risk describe both the probability of harm and its severity. They are usually broad, statistical measures that take into account the chance of being exposed as well as the chance of adverse effects from that exposure.

The magnitude of risk generally determines what action is taken to protect the public—the banning of a substance from the marketplace or restricting its application to specific uses or simply requiring warning labels on certain products to inform people of their potential hazards. In the latter case, the public and not the policy maker weighs the risks and benefits in order to make the difficult choices about which products to use.

How people perceive and accept risk is a major factor in their actions. In spite of its importance, however, there are very few studies on this subject. One study by Chauncy Starr is based on the assumption that past behavior is a valid indicator of present preferences. After analyzing the relationship between risk and benefit across a number of common activities, Starr concludes that: (1) the acceptability of a risk is roughly proportional to the real and perceived benefits; (2) people seem willing to accept voluntary risks about 1,000 times greater than they would tolerate involuntary risks that provide the same level of benefit; and (3) the acceptable level of risk is inversely related to the number of persons participating in an activity.

Often technological or scientific solutions for dealing with hazards may be inadequate without a knowledge of how they will affect individual decision making. A prime example is the large number of people who continue to smoke cigarettes despite the substantial and highly publicized evidence that indicates smoking can cause lung cancer. A governmental agency that bans a certain product must convince the public of its high risk in order to justify the action. Otherwise, the agency may continually be pressured to lift its ban.

We currently know little about how we react to scientific information concerning risk or about modes of communicating risk information. Perceived risk may depend greatly on the way in which relevant information is presented.

Judging safety—the balancing act

Safety is judged when properly identified risks are weighed on the balance of social values; for example, what people are willing to forego if a product were not available or what they would gain if it were. Acceptable risk, therefore, will vary with the benefit anticipated, as Starr noted. Highly beneficial products may be acceptable to people at greater risk to health and the environment than less useful ones. Fluorocarbon propellants used in aerosol hair sprays and deodorants may be considered unacceptable since they offer trivial benefits but pose a high risk to climatic changes in the environment as well as to public health. Yet other fluorocarbon uses, such as refrigerants, may be judged acceptable, at least until alternatives are developed.

Risk-benefit (or benefit-cost) analysis is the technique generally used to weigh risks and benefits. It is not a technique, however, that yields precise and objective answers. Rather, it is a framework for organizing available information. A sound analysis should present a full set of choices with appropriate data on costs, benefits and hazards for each option, and precise statements on the degree of uncertainty associated with each option. Even when these efforts are successful, the process still involves making tradeoffs and comparing practical benefits with moral risks (e.g., monetary value versus the value of human life). Because this is so, risk-benefit analysis is highly subject to political pressure. Until some common denominator is discovered to bridge the gap between different value systems (if that is possible), it remains a rudimentary tool for judging safety and therefore belongs in the public decision-making arena where a variety of viewpoints can be accommodated.

Making safe

The protection of our health and environment generally has come to require the imposition of governmental controls in the form of standards, the monitoring of those standards and their enforcement if noncompliance occurs. Usually when a safety issue comes to public attention and becomes the responsibility of a regulatory agency, it already carries a sense of urgency. Although the agency may have limited information, the risk may require a decision before adequate testing can be carried out. Decisions are made that sometimes must be reversed later. Arguments rage, not only over the risk itself but also over who should bear the burden of proving the facts about the risk.

Russell Train, former Administrator of EPA, told the Senate Public Works Subcommittee on Environmental Pollution, "One of the most distressing aspects of the job of Administrator of EPA has been the recurring need to make regulatory decisions which cannot be deferred, on a scientific basis which can charitably be described as barely adequate. Time and again we must extrapolate from fragmentary scientific data, and it seems that the frequency with which this must be done continues to increase. Only the course of future events will tell us for certain whether these extrapolations were justified."

Statutory and regulatory constraints

The current body of environmental law does not contain a harmonious and cohesive package of procedures for evaluating risk and safety. The laws are punctuated with inconsistencies as to the weight to be given costs, risks and benefits in decision making. Congress, viewing the issue of a socially acceptable level of risk in the Food, Drug and Cosmetic Act, has concluded it is a policy question involving basic social values. It attempts to define those social values by stating that no conceivable social or economic benefit can outweigh the risks from human ingestion of carcinogenic food additives and therefore prohibits any level of any carcinogenic additive. On the other hand, in the Safe Drinking Water Act, Congress calls for both health-based and enforceable contaminant levels which take into account technological feasibility and reasonableness.

Who should bear the burden of proof? This is another issue that needs to be clarified. Generally, the statutes (e.g., the Toxic Substances Control Act, the Food, Drug and Cosmetic Act) require proponents of new uses to establish the safety of their products. Problems arise, however, over how to deal with uses in existence at the time legislation is written which prohibits or restricts them. By

Underground Housing

Going Under to Stay on Top

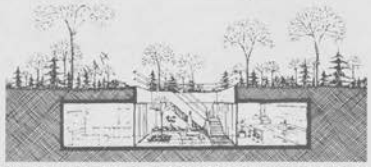
University of Minnesota Professor Charles Fairhurst, in an article "Going Under to Stay on Top," argues that our underground space resources, if utilized correctly, can provide an answer to some of the most serious problems we face today.

What problems? The skyrocketing costs of traditional housing. The combined expense and scarcity of energy supplies like natural gas and oil. The growing concern with environmental quality.

Why underground? Because underground housing is the most energy efficient and least expensive resource we have been ignoring for far too long. Studies by Dr. Fairhurst and other experts in the University's Civil and Mineral Engineering Department show that homes built partially or completely underground and insulated with earth require less heating in the winter and less cooling in the summer. They're also less expensive to build than aboveground homes and they enhance the environment by preserving more open space and natural surroundings.

The idea of going underground is not new. Pioneer Americans did it hundreds of years ago when they built sod houses on riverbanks and hillsides. Not only were those early frontier homes among the most energy efficient in history, they were built without the usual building materials and made use of all the existing resources including the physical lay of the land.

America's challenge of the 1980's may be to mirror that conservation ethic and adaptable ingenuity on a broadscale level. Much has already been done. Williamson Hall at the University is an excellent example of underground space development. The Castle Royal restaurant in Saint Paul is another. Since I introduced the "Cave" amendment to the National Weatherization Act (calling for a study of the feasibility of underground housing and of changes in building and home loan requirements necessary) my office has received hundreds of letters from people across the country who have underground homes or are in the process of building them.



An Underground House. Reprinted with permission from "Underground Space," the magazine of the American Underground Space Association.

Now Minnesota will soon have another first — a unique model community of single family homes built underground and heated by solar energy. The new demonstration program has received $500,000 in start up money from the State Legislature. State officials have asked the Department of Housing and Urban Development for additional funds. Both Vice President Walter Mondale and I support the project proposal and we are doing everything we can to get the HUD funds approved.

AMTRAK KEEPS RUNNING

Further cutbacks in AMTRAK service to the Twin Cities were thwarted when Congress passed a special $18 million appropriation.

The funds assure continuance of the Empire Builder and North Coast Hiawatha trains until spring or early summer.

My office has fought long and hard to keep our train service because of the vital importance to this community. Congress has requested the Department of Transportation to review all train routes and recommend alternative proposals by March. We can expect a final decision by summer.

Jobs, energy and the economy were the key topics when Congressman Bruce Vento spoke to the State AFL-CIO Convention in the Twin Cities. Sharing the podium with him were Charles Rafferty (center), president of the Saint Paul Trades and Labor Assembly, and Saint Paul Mayor George Latimer (right).

Have a question? Wish to express an opinion? Need help with a particular problem?

Please call or write either my Washington office or St. Paul office for service.

WASHINGTON OFFICE:
Congressman Bruce Vento
U.S. House of Representatives
Washington, D.C. 20515
(202) 225-6631

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U.S. House of Representatives
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Reports

Winter, 1977-78

Nuclear Waste — The Deadly Problem

Safe disposal of nuclear wastes, a problem which has haunted our country for decades, now threatens, as Tom Wicker of the *New York Times* puts it, to be a "Frankenstein's Monster."

It's not hard to be an alarmist when you realize that we already have over 75 million gallons of deadly high level nuclear waste stored in various locations in this country under sometimes unsafe conditions; or that our economy faces a shutdown of 23 nuclear plants beginning in 1979 for lack of storage space for spent fuel rods.

There is no such thing as permanent disposal of nuclear waste (some radioactive waste like plutonium has a half life of a half-million years!) and it is absolutely essential that it be retrievable for both safety and economic reasons.

Present laws and regulations have so many gaps because no single federal agency has the authority to closely regulate nuclear waste storage.

Last spring, other members of the Energy and Environment Subcommittee and I listened to horror story after horror story about carelessness in the handling and storage of nuclear waste.

A contractor in one of the western states used radioactive tailings for building blocks in the foundations of houses in a large subdevelopment. In other states, cracked and leaky storage tanks have contaminated surrounding areas. My office receives reports when radioactive materials are missing from nuclear plants or operations, and it does happen.

The nuclear waste problem is with us now. And it's not going to get any better unless Congress takes the initiative and makes the tough decisions in an area where the bureaucracy has been unable to act. After four months of study, I introduced a bill to control nuclear waste storage and disposal and eliminate the gaps in present laws. My Radioactive Waste Management Act has five major provisions:

- it requires strict federal regulation of long and short term storage of nuclear wastes generated by commercial, military and experimental plants and research.
- individual states can set stricter standards than the federal government for nuclear waste disposal within their borders.
- the Energy Research and Development Administration must restore background radiation levels at abandoned mines and mill sites to levels which existed before operations began.
- utility companies will be assessed to defray costs for storage and disposal of nuclear wastes they generate.
- all radioactive waste must be in retrievable, long term storage and must be constantly monitored.

The General Accounting Office's recent report, "Nuclear Energy Dilemma: Disposing of Hazardous Waste Safely," outlines the same concerns I felt and lists recommendations similar to those in my bill.

That report says: "Even if all activities that generate radioactive waste were stopped today, we would still be faced with a major radioactive waste disposal problem because of the large volumes of waste generated by this country's nuclear defense and research programs."

What we do now to assure safe nuclear disposal will affect future generations for thousands of years to come. Failure to act now could have deadly consequences.

A LOOK INSIDE

Senator Hubert Humphrey was honored by the U.S. House of Representatives, the first time in history that a Senator has been honored in the House Chambers. Minnesota Congressmen Bruce Vento and Rick Nolan (slightly hidden), and Congresswoman Millicent Fenwick of New Jersey were with Humphrey when this Associated Press picture was taken.

THE HOUSE RECORD IN THE 95TH CONGRESS

Bill	House Action	Present Status
ECONOMY		
$20 billion for a total 725,000 CETA jobs and 14,800 jobs for Older Americans, increases in Revenue Sharing and Railroad Rehabilitation.	Passed	Passed Senate; Signed into Law
$1.5 billion for 203,000 Youth Employment Program job and training positions; includes the Young Adult Conservation Corps which is patterned after the Civilian Conservation Corps of the 1930's.	Passed	Passed Senate; Signed into Law
$4 billion for 600,000 local Public Works Jobs.	Passed	Passed Senate; Signed into Law
$34 billion tax cut over three years to provide businesses a tax credit for certain new employees hired in 1977 and 1978. Also provides tax credits and simplification of tax computations for individuals, and includes my amendment providing tax deduction for home day care centers.	Passed	Passed Senate; Signed into Law
$2.25 billion for anti-recession (counter-cyclical assistance) to states and local governments through 1978.	Passed	Passed Senate; Signed into Law
Humphrey-Hawkins Full Employment and Balanced Growth Act, of which I am co-author.	Introduced and hearings held	Awaiting Subcommittee action on revised version
Extension of the Council on Wage and Price Stability for two years, including my amendment reframing the Council's authority and broadening its scope of power.	Passed	Passed Senate; Signed into Law
ENVIRONMENT		
Strict controls for strip mining to reduce environmental damage and reclaim mined lands.	Passed	Passed Senate; Signed into Law
Clean Air Act extending the auto emissions requirements for four years.	Passed	Passed Senate; Signed into Law
Endangered American Wilderness Act adding more than one million acres in western states to the National Wilderness System.	Passed	Passed Senate with major changes; in Conference Committee
$16 million over four years to help individual states with Endangered Species programs.	Passed	Passed Senate; Awaiting President's signature
Designating more than one million acres in the Boundary Waters Canoe Area as Wilderness and National Recreation Areas.	Two Bills introduced and hearings held	Awaiting Subcommittee action
Alaskan Lands Act preserving 102 million acres for the National Parks, Wilderness, Wild and Scenic Rivers and Wildlife Refuge Systems.	Introduced and hearings held	Awaiting Subcommittee action
ENERGY		
Formation of a new Cabinet level Department of Energy to consolidate functions of a number of federal agencies.	Passed	Passed Senate; Signed into Law
Continued regulation of natural gas prices.	Passed	Defeated by Senate; In Conference Committee
Energy Industry Divestiture Act, of which I am principal author, to separate producing, refining and manufacturing functions.	Introduced and hearings held	Passed Subcommittee; Committee action next
National Energy Act including these provisions:	Passed	In Conference**
• **Conservation Loans.** $2 billion for low interest loans for installation of conservation devices including insulation, storm windows and doors, clock thermostats, replacement furnaces and load management devices. For families earning up to $15,000 a year.	(Conference Committee Approved)	
• **Solar Energy Loans.** $100 million for low interest loans for solar energy equipment for all families. Maximum loan $8,000 payable over a fifteen year period.	(Conference Committee Approved)	
• **Schools and Hospitals.** $900 million for energy audits and installation of conservation devices in schools and hospitals; funding will also be available for technical assistance and energy audits for local and municipal government buildings.	(Conference Committee Approved)	
• **Appliance Standards.** Mandatory energy efficiency standards would be phased in over the next five years for refrigerators, freezers, dishwashers, clothes dryers, water heaters, room air conditioners, home heating equipment, furnaces, televisions, ranges and ovens, clothes washers, humidifiers and dehumidifiers. Once these standards are set, only appliances meeting them can be sold.	(Conference Committee Approved)	
• **Industrial Efficiency.** The Department of Energy will have 18 months to determine whether to require efficiency labeling or establish mandatory standards for pumps and motors. Large industrial users will have to report annually to the Department on their energy use.	(Conference Committee Approved)	
• **Utility Conservation.** New utilities would be prohibited from using gas and oil, and existing utilities will have to end their use of natural gas by 1990. Existing utilities will not be able to increase their use of oil, switch from oil to gas, or use greater amounts of natural gas than currently used. Some exemptions will be allowed—for instance, to meet environmental standards, if pollution control facilities are lacking, or if coal is not available.	(Conference Committee Approved)	
• **Pollution Control Loans.** $400 million for 1979 and 1980 for loans to utilities to help finance the installation of pollution control devices.	(Conference Committee Approved)	
• **Tax on gas guzzling automobiles.**	(Conference Committee Tentatively Approved)	
CRIME		
Federal Victims of Crime Act, of which I am co-author, providing $90 million over three years to assist in compensating innocent victims of crime for medical expenses and loss of wages.	Passed	Awaiting Senate action
HOUSING		
$13.7 billion over three years for housing and community development with special emphasis on older, declining urban areas. Includes $400 million each year for reclamation and revitalization in severely distressed cities which have housing built before 1940. Saint Paul will receive $1½ million more in 1978 Community Development funds because of this formula change.	Passed	Passed Senate; Signed into Law
LABOR		
Labor law reforms strengthening the National Labor Relations Board and facilitating the holding of union elections.	Passed	Awaiting Senate action
Minimum wage increase to $3.35 by 1981 and reduction of the tip credit to 40% by 1980.	Passed	Passed Senate; Signed into Law
Reform of the Hatch Act to allow federal and postal employees to be politically active and run for political office.	Passed	Awaiting Senate action
ETHICS		
New ethics code requiring broad financial disclosure by House members and key staff; a 15 per cent of salary limit on outside earned income by members; limits on honorariums; limits on gifts; a prohibition on personal use of campaign funds; abolition of unofficial office accounts; restrictions on use of the frank; and curbs on lame-duck travel.	Passed for House members only	
OTHER		
Strict prohibitions against child pornography and sexual exploitation of children.	Passed	Passed Senate; Awaiting President's signature
Requirement that U.S. representatives in international financial institutions vote against loans to countries which violate human rights.	Passed	Passed Senate; Signed into Law
Debt Collection Practices Act, of which I am co-author, protecting consumers against harassment and intimidation by debt collectors.	Passed	Passed Senate; Signed into Law
Welfare reform including changes in the Food Stamp, Aid to Families with Dependent Children (AFDC), and Supplemental Security Income (SSI) programs.	Introduced	Referred to special Subcommittee
The last action of the first session of the 95th Congress was passage of a major Social Security Financing Bill to safeguard benefits for 33 million Social Security recipients.	Passed	Approved by Conference Committee; Awaiting President's signature

***Other major provisions include a three-stage equalization tax to raise domestic crude oil prices to world levels by 1980; residential tax credits; and a requirement that utility rate structures reflect costs and vary charges on time-of-day and seasonal basis. The Conference Committee had not acted on these at the time this was written.*

IN THE 4TH DISTRICT, Congressman Bruce Vento toured the Roseville operation of the Sperry Univac Company, one of the largest employers (10,500 workers) in the Twin Cities area. Glenn C. Swenson, Sperry Univac manager of Systems Administration, showed Vento an example of back panel wiring, part of the memory access unit for the 1100/40 computer manufactured in Roseville. In addition to large scale commerical computers, Sperry Univac specializes in defense systems and has the headquarters for its defense systems operation in the Twin Cities.

Hazardous Waste:

Minnesota Confronts The Problem

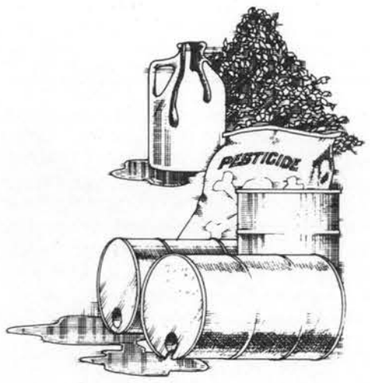
Every year Minnesota industries produce between 100,000 and 200,000 tons of toxic,corrosive, flammable, or otherwise hazardous wastes. Many of these dangerous materials are properly disposed of, but each year thousands of tons are illegally dumped into the environment.

Some are flushed into wastewater treatment systems, where they might disrupt the system, pass through untreated, or contaminate the treatment sludge. Others are poured directly into swamps or rivers. Still others are buried in the soil, eventually migrating into underground water supplies, or vaporizing to pollute the air.

While industry may be able to partially restrict the generation of hazardous wastes, most are the unavoidable by-products of our nation's high standard of living. Products ranging from agricultural goods, to electronic devices, to textiles generate hazardous wastes.

Improperly disposed hazardous wastes can seemingly disappear, only to turn up years later. Example: in 1972, 13 employees of a construction company in Perham, Minnesota were stricken with arsenic poisoning after drinking water from a new well. Called in to investigate, the MPCA found that in 1934 farmers had buried grasshopper pesticides about seven feet underground near what would become, nearly *40 years later,* the construction company well. The arsenic-laden pesticide had gradually seeped through the soil and into the underground water supply.

Other problems, however, haven't taken 40 years to develop. In 1974, an employee of the Pine Bend Landfill suffered severe burns over 85 percent of his body after his bulldozer struck a drum of flammable waste. The waste never should have been sent to the landfill in the first place but, unknown to the operator, it had been delivered during the previous night.



While these are dramatic incidents of damage from poor hazardous waste disposal practices, the most damaging problems are not always so obvious. Often, the effects of hazardous waste are insidious, building up gradually over the years, sometimes resulting in chronic illnessess that are nearly impossible to trace back to the real cause.

The MPCA is presently facing the hazardous waste challenge on two fronts. The Agency's major priority for 1978, according to Executive Director Sandra Gardebring, is the adoption of a new set of regulations for the storage, handling, and disposal of hazardous wastes. Additionally, in cooperation with the U.S. Environmental Protection Agency (EPA) and the Metropolitan Waste Control Commission, the Agency is involved in the development of a controversial demonstration land disposal facility for certain hazardous wastes.

The New Regulations

The proposed regulations, which were still in the public hearing stage when *Inside Report* went to press, give complete "cradle to grave" responsibility to generators of hazardous wastes, under the review of the MPCA.

CALENDAR

February

- **February 14** Clean Air Act Amendments Forum sponsored by the U.S. Environmental Protection Agency, Hyatt Regency O'Hare Hotel, Chicago. The EPA will discuss the new Amendments with industrial and environmental groups and other concerned citizens. Call (612) 296-7284 for details.
- **February 21,** Public Hearing on Interstate 494 and Hwy. 18 interchange, 7:15 p.m., Council Chambers, Bloomington Municipal Building, 2215 West Shakopee Road. Hearing will consider location, design features, and social, economic and environmental effects of proposed Interchange modification.
- **February 22** Informal meeting about "Environment and Jobs" between the U.S. Environmental Protection Agency and Minnesota Labor Unions; 10 a.m. Hotel Duluth. For more information call (612) 296-7284.
- **February 23** EPA/Labor Union meeting, (see above) 7 p.m., Capp Towers, St. Paul, Room 25. For more information call (612) 296-7284.
- **February 22, 23, 24** Activated Sludge Workshop, Holiday Inn, Mankato (Contact Stabilization and Extended Aeration), Holiday Inn, Mankato. Call (612) 296-7233 for details.
- **February 28,** Regular MPCA Board meeting, 9:00 a.m., Board room, 1935 W. County Rd. B2, Roseville. For agenda details call (612) 296-7284.

MPCA INSIDE REPORT FEB. 1978 Vol. 2 No. 2 Published monthly by the Minnesota Pollution Control Agency, 1935 W. County Road B2, Roseville, MN 55113. All questions and comments should be sent to the Public Information Office at the above address, or cal (612) 296-7284.

Minnesota Pollution Control Agency
1935 W. County Road B2
Roseville, MN 55113

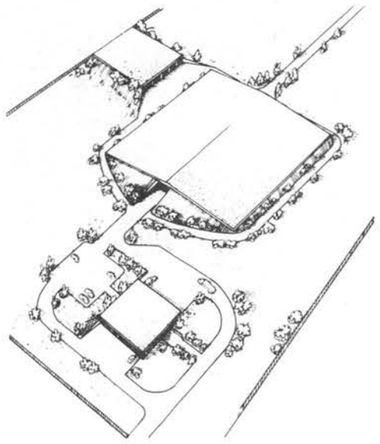
MPCA
February 1978
Minnesota Pollution Control Agency
INSIDE REPORT

Four Hazardous Waste Sites Selected

The Metropolitan Waste Control Commission (MWCC) has named four potential sites for a demonstration hazardous waste disposal facility. The on-land facility, financed by a $3.7 million Environmental Protection Agency grant and $1.7 million from the MWCC, would receive a portion of Minnesota's hazardous wastes for permanant disposal. The four sites are:

- In Eden Prairie, north of Hwys. 169 and 212, south and west of Flying Cloud Airport, along the Minnesota River Bluffs.
- In Cottage Grove, north of the Chicago, Milwaukee, St. Paul & Pacific railroad tracks, east of Chemolite Road, and south of Hwys. 61 and 10. The land is owned by Minnesota Mining and Manufacturing and is near its Chemolite plant.
- In Rosemount, north of County Rd. 38 and southwest of Hwy. 55. The site adjoins an MWCC wastewater treatment plant.
- In Rosemount, east of Rich Valley Blvd. and south of the Pine Bend Sanitary Landfill (called the "Roseport" site).

The final site will be selected after extensive soil borings and after review of environmental and land-use impacts of the sites.



The Hazardous Waste Land Disposal Facility would contain wastes in a carefully-controlled, safe system of impervious liners and monitoring devices.

MPCA Enters Nuclear Liability Suit

The MPCA Board voted unanimously at its January 24 meeting to enter an amicus (friend-of-the-court) brief in coming U.S. Supreme Court hearings on the constitutionality of the Price-Anderson Act.

The Act was passed by Congress in 1957 to limit the combined liability of all responsbile parties for injuries arising out of a nuclear power plant accident to $560 million. Primarily, the Price-Anderson Act was designed to encourage private industries to enter the nuclear power plant field.

Last March (1977), a federal district court in North Carolina struck down the Act as unconstitutional on the grounds that it violates the due process and equal protection clauses of the U.S. Constitution because it allows destruction of lives and property without reasonable certainty of compensation, and because it irrationally places the risk of nuclear accidents on those who live near the plants.

The defendant in the dispute, the Duke Power Company, is presently constructing two nuclear power plants outside Charlotte, North Carolina, and has appealed to the Supreme Court. The MPCA will intervene on behalf of the plaintiffs (the Carolina Environmental Study Group, the Catawba Central Labor Union, and 37 individuals who live near the two plants).

The Supreme Court's decision is likely to have ramifications in every state with operating or propsed nuclear plants.

Inside Report is published monthly by the MPCA's Public Information Office. If you would like to be added to the mailing list, please send a postcard with your name and address to:

Inside Report
Public Information Office
MPCA
1935 W. County Rd. B2
Roseville, MN 55113

Hazardous Waste Continued

The regulations require industries to evaluate their wastes to determine if any are hazardous according to MPCA criteria. For those wastes that are hazardous, the generator must submit a detailed hazardous waste management plan, indicating how wastes will be handled. Generators must then strictly adhere to the plan. Wastes would be transported by registered haulers and disposed of in permitted disposal facilities.

Through these regulations, the MPCA hopes to accomplish a variety of objectives. Presently, there is no way of knowing exactly what happens to most of Minnesota's hazardous wastes — in fact, there is no way of knowing exactly how much hazardous waste is generated in the state (estimates range from 116,000 tons to 184,000 tons). The new regulatory program will provide accurate records of waste generation and disposal practices throughout the state, and will allow the MPCA to take action against environmentally destructive practices.

The regulations will encourage an actual reduction in hazardous wastes by requiring industry to bear the costs of environmentally sound recycled, for example) or neutralized (acids and bases can be mixed). Certain other wastes can be safely incinerated at extremely high temperatures. Finally, some wastes may have to be deposited in a tightly controlled land disposal facility.

The Land Disposal Facility Grant

In 1975, the EPA awarded a $3.7 million grant to the MPCA for the construction of a land disposal facility for certain non-radioactive hazardous wastes. Subsequently, the MPCA contracted with the Metropolitan Waste Control Commission to build, own, and secure a contractor to operate the facility.

The facility, which is intended to accept only a small protion of the state's hazardous waste, would contain wastes in a completely enclosed system of impermeable liners, with backup collection system safeguards and an extensive monitoring system to detect potential problems. Industries using the facility would bear the costs of disposal, including long-term monitoring and maintenance.

However, residents of potential siting areas (see related story, left column) fear that the facility may pose a threat to their health, or that property values in their area will decline.

Some residents contend that their area is too populated, that the facility should be located in a more rural area. Others say that the facility should be within the Twin Cities urban center, where a high proportion of these wastes are actually produced. Since one of these two arguments applies no matter where in Minnesota an attempt is made to locate a disposal facility, the ultimate question may be: would a hazardous waste disposal facility be accepted anywhere?

Facing the Challenge

Whether or not a land disposal facility is ever sited in Minnesota, the hazardous waste problem will never go away by ignoring it. The new reguations will provide a complete management system for controlling hazardous waste disposal, but inevitably there must be facilities to handle these materials safely.

NEWS ROUND UP

NSP Pays $35,500 Penalty

Northern States Power Company (NSP) has agreed to pay a $35,500 penalty as the result of a non-compliance settlement approved January 24 by the MPCA Board.

The MPCA alleged that NSP had failed to undertake in a timely manner studies necessary to determine appropriate thermal limits for its Black Dog electrical generating plant in Burnsville. The MPCA also charged that NSP had failed to complete pollution control programs for the plant's coal and ash storage and handling facilities as required by state and federal law. Further, an MPCA inspection had indicated the existance to two discharges to the Minnesota River which were not listed in NSP's permit application for the plant.

In addition to the penalty, NSP also agreed to adhere to time-schedules for thermal studies and to complete construction of coal dock area runoff control projects and a riverback erosion control program.

Engelbrecht, Gadler, Genis Reappointed

Art Engelbrecht, Steve Gadler, and Burton Genis were reappointed to the MPCA Board early last month by Governor Rudy Perpich. Each will serve a four-year term.

Engelbrecht, a farmer from Alexandria, Minnesota, is a former State Representative and was first appointed to the Agency Board in 1973. Gadler, a resident of St. Paul, is a retired Air Force Colonel and a professional Engineer, and was first appointed to the Board in 1967. Genis, a resident of Crystal, is the Assistant Manager, Minnesota Joint Board, Amalgamated Clothing Workers of America, and was first appointed in 1973.

The remaining Board members are: **Joseph Grinnell** (Board Chairman), Minneapolis, Senior Vice-President of Investors Diversified Services Inc. (term expires 1981); **David Zentner** (Vice Chairman), Duluth, an Insurance Planning Consultant (term expires 1979); **Howard Andersen,** Rochester, Physician (term expires 1979); **Carol Buckman,** Nisswa, Freelance Writer and City Councilperson (term expires 1980); **Harold Field,** Minneapolis, Attorney (term expires 1980); and **Marion Watson,** St. Paul, Program Director for KUOM Television (term expires 1981).

Homart Fined For Failure To Report Spill

Homart Development Company, Burnsville, has agreed to pay $3000 as penalty and damages for failure to notify the MPCA of an oil spill that polluted Early Lake in October, 1977. The spill originally occurred at a Burnsville shopping center, owned by Homart, when several hundred gallons of heating oil were accidentally spilled into the municipal storm sewer system, which eventually empties into the lake. MPCA Spills Unit personnel traced the oil through the sewers to the shopping center. In addition to paying the penalty, Homart assumed the cost of clean-up of the lake and has agreed to take measures to prevent similar accidents in the future.

League of Women Voters of the United States 1730 M Street, N.W., Washington, D. C. 20036 Tel. (202) 296-1770

memorandum

February 27, 1979

TO: State EQ or NR Chairs (Memo only to State Presidents)

FROM: Hester McNulty, Natural Resources Coordinator

RE: LWVUS Comments on EPA's Proposed Hazardous Waste Regulations

Enclosed is a copy of the LWVUS comments on EPA's Proposed Hazardous Waste Guidelines and Regulations, as well as a copy of the Regulations. We regard EPA's proposed Hazardous Waste Regulations as a high priority item. I will present the LWVUS statement at EPA's public hearing on March 7 in Denver.

Our comments principally address the exemption of generators that produce less than 100 kilograms (220 lbs.) per month of hazardous waste and the standards for siting hazardous waste disposal facilities. A number of other issues are also examined, but in less detail.

The deadline for comments is March 16, so there is still time for your state League to develop a statement if you have not already begun working on one. You may want to focus on specific state concerns that are in line with state and national positions. If you do comment, you should send your letter to: John Lehman, Director, Solid Waste Management Division, Office of Solid Waste (WH-565), EPA, Washington. D.C. 20460. We also would appreciate receiving a copy of your comments, sent in care of the EQ department. If you have any questions, please contact Connie Weis O'Mara at (202) 296-1770, ext. 284.

A Congratulatory Note:

I was a panelist at a Water Quality Conference in Denver two weeks ago, attended by most of the state 208 Directors. The number of compliments expressed for the water quality work of the state and local Leagues was nothing short of impressive. I knew all the time you were out there, but it was really brought home to me how <u>much</u> you are accomplishing. I believe the League has been one of the most influential forces in water quality planning and management.

A Toxic Substances Primer

Darlene Cody, in her first trimester of pregnancy, went hiking on a national forest trail. Part of the area through which the trail wound was very smoky, as it was being subjected to a controlled burning by the U.S. Forest Service. Unbeknownst to Mrs. Cody, the area had also been sprayed with the herbicides 2,4,5-T and 2,4-D. Mrs. Cody's baby was born with a cleft palate.

The Codys suspect dioxin as the cause of their baby's birth defect. Particularly toxic chemicals known to cause tumors and birth defects in test animals, dioxins are unavoidable impurities produced in manufacturing 2,4,5-T.

An unrelated article in the prestigious journal *SCIENCE* bore this headline: "Dioxins Have Been Present Since the Advent of Fire, Says Dow." When alarming levels of dioxins appeared in fish taken from a river into which Dow Chemical Company discharges the manufacturing waste from its 2,4,5-T production facility, Dow scientists began looking for dioxin sources other than their own waste. They say they have found the chemicals in power plant ash which impacts the river, in fireplace soot, cigarette smoke, auto exhaust and, presumably, forest fire smoke. In other words, they claim there are natural background levels of dioxin in the environment from all normal combustion processes.

These disparate reports are symptomatic of several issues surrounding the question of toxic substances control. Some people, like the Codys, are suddenly becoming aware of the potential impacts of toxics on their lives. But, understandably, much of the public is either unaware of the problems or confused and skeptical of all such reports; many develop what might be called a defensive apathy. Government is attempting to reduce public exposure to toxics, but such action puts industry on the defensive. And both industry and public interest groups have some valid concerns about the ways in which toxic substance laws and regulations are written and enforced.

There are numerous routes of exposure to numerous substances that produce numerous toxic effects. So an individual is somewhat justified in feeling like a hapless victim. But a person also has the ability (and the responsibility) to avoid, if possible, certain voluntary exposures to toxic materials—like smoking, excessive exposure to the sun or poor dietary habits. A sharing of responsibility is required.

Definition by effect

Toxic substances can be best defined by what they can do. Toxics are poisons. But their effects may be quite different from those one would commonly associate with poisons. Certainly, death or violent illness can result from exposure to many substances in commerce. Accidental exposure to chlorine gas from a train derailment, for example, would be termed an *acute* effect. However, the kinds of effects produced by many toxic substances are *chronic* in nature, i.e., they may cause subtle but irreversible physical problems and may harm subsequent generations.

Carcinogenicity

The question uppermost in people's minds is, *Does it cause cancer?* Next to heart disease, cancer is the leading cause of death in the United States—one in five deaths are cancer related. Another grim statistic predicts that one in every four Americans will develop cancer.

Cancer is really a group of diseases, and over a hundred different types have been identified. But how a particular substance induces cancer is still largely a mystery. One theory is that the "carcinogen" directly damages or alters the program of instructions for the cell—its genetic materials. Obviously, cells in different organs of the body are specialized. They grow and replace themselves at different rates. However, the genetic messages in these cells also command cooperation. Cancer may be produced when the toxic intruder somehow breaks down or overrides the cooperative part of the program.

Some substances may be indirect carcinogens, i.e., they may damage certain body cells that would then become sensitive to other "cancer promoters." This theory may partially explain why there may be a long latency between exposure and development of cancer. Also, the impact of two or more toxic agents can multiply the chances of cancer. For example, cancer of the larynx correlates almost exclusively with the combination of heavy drinking and smoking. Another disturbing observation is that one may only require brief or infrequent exposure to a substance in order for it to alter certain body cells irreversibly. One further complication is that a substance like sodium nitrite (a food preservative) may not itself cause cancer, but is converted by the body to nitrosamine—a very potent cancer promoter. It is ironic that the body's own attempt to change and remove foreign substances may trigger a fatal chain of events.

Mutagenicity

A mutagenetic effect is one that alters the genetic material of sperm and egg cells and leads to undesirable inherited conditions. A mutation can be a gross and readily apparent malformation in the offspring, or it can be a subtle but still dangerous

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condition. In fact, these more subtle changes in the human "gene pool" are of special concern. For example, researchers have developed a theory that one cause of arteriosclerosis (the clogging of arteries which leads to heart attack and stroke) is a mutation that causes cells in the walls of the artery to form small benign tumors. These tumors then provide sites around which cholesterol deposits grow.

The effect of a mutagen is closely related to that of a carcinogen, i.e., creating changes in genetic information. In fact, the ability of a substance to cause a mutation is a cue that it could also cause cancer. This is the basis for the short-term Ames test that looks for mutations in bacterial strains exposed to a test substance. Still, we must view such substances and their mutagenetic effect as danger enough. Mutagenesis is an insidious effect. Perhaps because of an unrealized exposure to a mutagen we may will disease and suffering to our offspring—and they to theirs.

Teratogenicity and other reproductive effects

A birth defect is the condition commonly associated with the term teratogenicity. Of course, a mutation can cause birth defects. But a teratogenic agent is one that affects the fetus during formation. The thalidomide babies of the early 1960s are very tragic examples of a teratogenic effect. When a number of babies were born with gross malformations, the cause was traced back to thalidomide, a new drug being prescribed as a sedative for pregnant women.

But a teratogenic effect may also be very subtle. The presence of learning disabilities or minor brain damage has been correlated to the use of anesthetics during birth. A very latent teratogenetic effect has surfaced in daughters of mothers given the hormone DES as an antimiscarriage drug. The daughters, most of them in their early twenties, show a high incidence of a rare vaginal cancer. Excessive exposure to other substances such as heavy metals, pesticides and other synthetic organic compounds has also been linked to birth defects.

Of course, another reproductive effect of exposure to a toxic substance is the inability to reproduce at all: sterility. Male workers in a plant producing the pesticide DBCP noticed that—not for lack of trying—they had few if any children. An investigation was held and tests showed that the workers' sperm counts were very low or nonexistent. Indeed, research done several years prior to this incident showed atrophy of the testes in laboratory animals exposed to DBCP.

Neurological and behavioral effects

Emotional and behavioral abnormalities increasingly are being linked to an individual's acute or chronic exposure to toxic materials. The first symptoms of trouble in the Kepone incident (Hopewell, Virginia—1975) were workers' complaints of severe headaches, loss of memory, high anxiety levels and uncontrollable tremors. A somewhat less dramatic but still serious example is the possibility that hyperactivity in some children can be directly linked to certain food additives. And, of course, lead has been the focus of much attention as the cause of a wide range of neurological disorders, especially in children. One basic biological fact is crucial: nerve cells, if damaged or destroyed, have little or no capacity to repair themselves.

Irreversible and persistent...

There are numerous potentially toxic substances that may affect us in a myriad of ways. Dr. David Rall, Director of the National Institute of Environmental Health Sciences, sums up the problem: "The important characteristic of all these effects is that they are not only persistent but also irreversible. Removing the chemical does not always stop the process that leads to disease, disability or death. Large populations may be exposed for long periods of time before the exposure and subsequent toxicity becomes evident."

Federal laws regulating toxic substances

The Federal Food, Drug and Cosmetic Act (as amended 1958, 1962) requires safety and performance testing of all new drugs, foods, food additives and cosmetics. This law contains the famous Delaney amendment which bars any substance showing carcinogenic potential in test animals. Administering agency: Federal Food and Drug Administration (FDA), Department of HEW.

The Clean Air Act (as amended 1970, 1977) regulates emissions from both mobile and stationary sources and sets health-based ambient standards for major classes of pollution. Section 112 also controls point-source emissions of "hazardous air pollutants" such as mercury, asbestos, beryllium and vinyl chloride. Administering agency: EPA.

The Clean Water Act (as amended 1972, 1977) sets national clean-water standards and regulates both point and non-point discharges of pollutants into waterways. Section 307 controls toxic pollutants, and EPA is to set specific limitations for their discharge. Section 311 regulates toxic spills.

The Occupational Safety and Health Act (1970) sets exposure standards for toxic and hazardous materials in the workplace so that "no employee will suffer material impairment of health or functional capacity." Administering agency: Occupational Safety and Health Administration (OSHA), Department of Labor.

The Consumer Product Safety Act (1972) and the *Federal Hazardous Substances Act* (as amended 1960, 1969) give broad power to limit or prevent public exposure to toxic or hazardous materials in consumer products (excluding tobacco, foods, drugs and cosmetics). Administering agency: Consumer Product Safety Commission (CPSC).

The Federal Insecticide, Fungicide and Rodenticide Act (1972) requires registration of all pesticides and their uses, plus certification of applicators. One of the few laws specifically intended to protect ecological systems. Administering agency: EPA.

The Safe Drinking Water Act (1974) sets health standards for toxic contaminants (such as trihalomethanes and synthetic organic chemicals) in finished drinking water. This law also regulates underground injection of wastes in order to protect ground water. Administering agency: EPA.

The Hazardous Materials Transportation Act (1974) regulates transportation of a wide range of substances including toxic chemicals. Sets standards for containers and requires registration of transporters. Administering agency: Department of Transportation (DOT).

The Resource Conservation and Recovery Act (1976) establishes a "cradle to grave" regulatory system for proper treatment, storage and disposal of hazardous wastes. This law outlaws open dumps as well as disposal of hazardous wastes in sanitary landfills. Sets criteria for construction of proper hazardous-waste disposal facilities. Administering agency: EPA.

The Toxic Substances Control Act (1976) requires premarket toxicological testing of all new chemicals. All existing chemicals in commerce—excluding pesticides—must be identified and testing can also be required. Broad power is given for banning, limiting or modifying use, manufacturing and processing of a substance which could pose an unreasonable risk to human health or the environment. Administering agency: EPA.

Routes of exposure

How are we exposed to toxic substances? There are a multitude of exposure routes, some more obvious than others. And often it is difficult to draw a direct cause-and-effect relationship between exposure to a toxic material and development of a specific condition. It is also important to make a basic distinction between *involuntary* and *voluntary* exposure.

What you don't know

Accidental or catastrophic incidents are among the most publicized forms of involuntary exposure. A train derailment that releases a toxic gas or causes an explosion subjects people to some rather obvious and acute effects. But some chronic effects can also be readily linked to catastrophic events. One example is the high incidence of birth defects and miscarriages discovered in the Love Canal area of Niagara Falls, New York. The cause: a slow eruption of an old chemical waste disposal site upon which homes and a school were allowed to be built. Heavier than normal rains over a period of six years caused a rise in the water table, bringing with it rusting and rupturing barrels of more than 82 different chemicals—11 of which are suspected carcinogens.

The workplace is another significant route of exposure to toxic or hazardous substances. It is, in essence, the closest thing we have to human experimentation. The few direct, airtight correlations made between exposure to a specific toxic substance and development of specific effects have occurred in the workplace. For example, in the early 1970s liver cancer was discovered in some workers in plastics plants around the world. Medical records of former workers were checked and more cases of the same cancer were found. What made the discovery so significant is the fact that the particular form of liver cancer found is very rare in humans. The cause was determined to be workers' exposure to vinyl chloride, the starting material for the common plastic polyvinyl chloride (PVC).

Another rare form of cancer that affects the lungs and abdomen has been directly related to workplace exposure to asbestos. Such discoveries seem to appear regularly in the news. A report published by the National Institutes of Health (NIH) estimates that approximately 100,000 Americans die of job-related illness every year.

A great deal of media attention has also been focused on known or potential toxic substances in consumer products. This route of involuntary exposure is particularly frightening to the public, especially when new disclosures are made about products that have been used and trusted for a number of years. The controversy surrounding saccharin as a potential human carcinogen is one good example, as is evidence that suggests that use of hair dye may predispose women to breast cancer.

We make a tacit assumption that the foods, drugs and cosmetics on the store shelves are "safe" or they would not be on sale. So it is particularly confusing and ironic to find that a substance that has been added to prevent food spoilage (like nitrite added to bacon) may be a source of other, more insidious effects.

Potential human carcinogens have also been discovered in drinking water. Is nothing sacred? People living in areas with high levels of nitrates in drinking water show a higher-than-average incidence of stomach cancer. Nitrates may be natural in origin or may result from nitrate fertilizer runoff. Synthetic organic chemicals, some carcinogenic, from industrial pollution have also been detected in water supplies. But another irony of public health protection crops up here as well. The chlorine traditionally added to disinfect both drinking water and sewage effluent may be combining with natural organic material to form carcinogenic chlorinated hydrocarbons.

The toxic substances in our ambient environment (especially the air) add to involuntary exposure. Unnecessarily high levels of particulates, lead, ozone, oxides of nitrogen and sulfur, carbon monoxide, plus a host of other less common but still hazardous air pollutants, exist in most urban areas and even in rural areas. We may not be safe indoors, either. For example, airborne asbestos fibers have been detected in older school and office buildings. Of course, one could argue that we have only ourselves to blame because the sources of these ambient toxics are directly related to auto use, industrial production and other human activities. This may be true. Nevertheless, breathing these pollutants is an involuntary reflex.

To thine own self...

We wouldn't voluntarily subject ourselves to toxic substances, right? Wrong. But we wouldn't do it if we had a clear understanding of the risk, right? Wrong again. We do it every day. Conscious, personal habits are the cause of many toxics-related diseases. Smoking is the most obvious example. Cancers of the lungs, esophagus and bladder have been directly linked to tobacco consumption. It is possible that 25 percent of all cancers are tobacco related. Another recent western cultural phenomenon—sunbathing—has been linked to a large increase in the incidence of melanomas—skin cancer. We are also coming to realize that personal dietary habits can predispose us to harmful conditions. For example, people who consume abnormally high quantities of fat run a high risk of developing cancer of the colon.

And voluntary personal actions, when combined with involuntary exposure to toxic substances, can multiply the chances of contracting cancer or other conditions. These "synergistic" effects are of growing concern. For example, future occupational safety rules may bar workers who smoke from handling such materials as asbestos, talc or uranium ore.

Sharing the responsibility

It is easy to feel overwhelmed by the potential of involuntary exposure to toxics. It's also human nature to place the blame on something or someone else. Such a feeling is supported by publicized statistics that may be misleading, if not inaccurate: There are 2 million known chemical compounds, 30,000 of which are in substantial commercial use . . . 1,000 new chemicals are developed each year . . . 1,000 chemicals are suspect carcinogens . . . 60 to 90 percent of all cancers are caused by "environmental" factors. But the definition of "environmental" may include such activities as smoking and drinking and excessive exposure to the sun. The problem of involuntary exposure to toxic substances is very serious. While government and industry have a responsibility to protect the workers and the general public from involuntary exposure, individuals must also take some of the responsibility for voluntary exposure to potentially harmful materials.

Controls

A number of federal laws attempt to protect public health and the environment from toxic substances (see box on Laws). And, as one might expect, the focus of these various laws closely parallels the numerous routes of involuntary exposure. Toxics laws are for the most part extensions of public health protection efforts. And the scope of these laws and control philosophies has changed noticeably over time.

Major environmental legislation passed in the early 1970s focused on controlling pollution insults to specific media (air, water, land) *after the fact*. The methods used include setting "ambient" standards plus specific emissions standards to limit the amount of a pollutant allowed into the environment. More recent legislation is specifically designed to take a *preventive* approach. For example, the Toxic Substances Control Act and the Federal Insecticide, Fungicide and Rodenticide Act require testing of new chemicals before they enter commerce. The evolving control philosophy also places increased emphasis on protecting whole ecological systems.

The diversity of toxics-related laws, most of them administered by the Environmental Protection Agency (EPA), is impressive. For officials at EPA, the Toxic Substances Control Act (TSCA) and the Resource Conservation and Recovery Act (RCRA) were the capstones in the construction of pollution-control authority. (For more detailed information about these two laws, see LWVEF Pub. # 564, *Federal Environmental Laws and You.*)

While TSCA in particular has received a great deal of public attention, EPA officials are quick to point out that this law was designed as a gap filler, not to supersede other environmental laws. For example, the first large-scale toxics-control effort will take place under the Federal Water Pollution Control Act, when EPA sets effluent standards for 65 specific toxic substances that enter the water environment from industrial facilities and other sources.

However, what some observers call diversity, others brand inconsistency. In *Current Issues in U.S. Environmental Policy* (Resources for the Future, 1978) Paul R. Portney outlines several problems under the "umbrella" of toxics-related laws. "One problem with this umbrella is its irregular construction. That which it is to protect us against is defined differently in different legislation. Moreover, the kind of protection that the umbrella is designed to offer—what legislators have chosen to call the margin of safety—varies from act to act. Finally, certain sections of the umbrella are to be designed with costs in mind while other sections are to protect us regardless of the expense."

And when it comes to administering the laws and developing coherent regulatory policies, government officials freely admit to additional problems. According to Barbara H. Franklin of the Consumer Product Safety Commission (CPSC), the efforts of government are "akin to 30 different acts being performed simultaneously at a three-ringed circus that lacks a ringmaster."

Commissioner Franklin was speaking of the need for developing a consistent federal cancer policy, one of several toxics regulatory issues. There are other questions, especially those related to testing of toxics. Just what current chemicals or substances should be given priority testing? What type of testing will be required and how extensively must new chemicals be tested? Shouldn't the same chemical be controlled consistently through different government programs? A related problem is the shortage of qualified toxicologists. How can

Misconceptions

The following statement, titled "Common Misconceptions About Cancer-Causing Substances" (July 1978), was prepared by Dr. R. David Pittle, Commissioner, U.S. Consumer Product Safety Commission. The concepts quoted here underlie the regulatory philosophy of CPSC and other federal agencies that deal with carcinogens. Although authorities in industry may not be as confident as Dr. Pittle about the applicability of animal test data to humans, in general his points are supported by many in the academic community.

"Recent controversies such as that over the Food and Drug Administration's proposed ban on saccharin have generated a number of exaggerated, and sometimes false, statements about carcinogens (cancer-causing substances). The more serious of these claims include:

1. *Everything causes cancer when taken in large enough doses.*
This is not true. Most substances do not cause cancer—no matter how high the dose. The ability to cause cancer is actually a rare quality exhibited by only a relatively small number of the many thousands of chemicals in use. In a study by the National Cancer Institute and Bionetics Research Laboratories completed in 1969, tests for carcinogenicity were performed on approximately 130 pesticide and industrial chemicals. The substances were selected on the basis of their toxicity and similarity to known carcinogens. Despite this weighting in the choice of substances, less than ten percent of the substances produced cancer tumors in test animals.

Why, then, are animals given such large doses in the tests? Keep in mind that if a substance is not a carcinogen, animals exposed to it simply will not get cancer—no matter how high the dose. For example, test animals given large doses of sugar did not develop cancer. If the dose is too high the animals may die of poisoning, but they will not get cancer.

There are two basic reasons why large doses of a substance are used in laboratory experiments. The first is a practical one. Most scientists agree that as the dose of a carcinogen increases, so does the number of animals exposed to it who get cancer. Therefore, by giving the test animals large amounts of the substance being tested, scientists can ensure that a carcinogen will cause cancer in enough test animals to make the test meaningful. Smaller doses could be used only if the number of animals were vastly increased—perhaps as many as 30,000 animals would be needed per test to be relatively certain that a carcinogenic substance would be identified. Since long-term animal testing costs a great deal of money—between $150,000 and $300,000 for as few as 50 animals tested per dose level—it is largely a matter of economics to choose the "small test group-high dose" option.

The second reason high doses are used is to compensate for physiological differences between laboratory animals and people. In general, humans metabolize substances much more slowly than small animals. A mouse, for example, circulates its blood twenty times as rapidly as a person. Consequently, substances may persist much longer in people than they do in animals. Moreover, human beings may be more sensitive to chemicals than test animals.

2. *Just because a rat gets cancer does not mean a person will.*
Animal testing has been widely accepted by the scientific community and underlies much of the work in experimental biology and medicine. Small animals, such as rats and mice, have long been used as a model for human cancer because the characteristics of cancer are substantially the same for laboratory animals and humans. The validity of using animals as models is borne out by the fact that all of the substances that are known to cause cancer in people, with two exceptions that are still under investigation, also cause cancer in laboratory animals. For over 30 years numerous scientific committees, including committees of the National Academy of Sciences, the National Cancer Institute, and the World Health Organization have studied the question of using the results of animal tests to predict that a substance will cause cancer in humans and have concluded that a substance that causes cancer in animals is likely to do so in people.

3. *Small amounts of a carcinogen do not cause cancer.*
Two points are very important to keep in mind. The first is that small amounts of some carcinogens, such as radiation and asbestos, have been shown to increase the risk from cancer. Moreover, no level of exposure to a carcinogen, no matter how small, has ever been shown to be safe. Most authorities agree that if a large group of people is exposed to a low level of a carcinogen, some members of the group can be expected to get cancer.

The second point is that we are all exposed to a number of different carcinogens. Exposure to one carcinogen may add to the risk from exposure to another. . . . Prudence, therefore, dictates avoiding to the maximum extent possible exposure to even small amounts of carcinogens."

there be adequate administration of toxics laws and adequate compliance with TSCA in particular, if qualified people are not available to do the work?

A number of intra- and interagency committees, task forces and other groups at the federal level are working to answer these and other questions. But finding solutions acceptable to both industry and public interest groups will not be easy.

Industrial perspective

While EPA would characterize such laws as TSCA and RCRA as capstones, industry officials are more likely to consider them gravestones. The chemical industry, in particular, foresees a number of ill effects from the implementation of these and other toxics-related laws. There are two basic concerns—the impact on costs and the impact on competition.

Under TSCA, a company must submit toxicological test data, detailed chemical identification and production data and must document the use and ultimate fate in the environment of any new substance that it plans to market. A "significant new use" of an existing substance must also be reported. EPA has 90 days to respond to such a report. Production can proceed after this period if EPA does not determine that the substance poses a "substantial risk" to human health or the environment.

Industry officials fear that this whole process will be very expensive. The added paperwork plus the delays in starting production are one part. But the largest expense comes with testing. Adequate testing of just one new chemical may, industry officials assert, cost from $50,000 to $250,000, possibly more. This could mean costs in the billions of dollars industry-wide. Time is also a factor; it may take two to three years to perform adequate animal tests on any given substance. Testing delays, say industry representatives, further increase costs because the eventual payback of a new product is pushed further into the future.

There are other effects. Chemical spokesmen say that product innovation is the lifeblood of their industry. And timing the entry of a new product into this highly competitive marketplace is crucial. Higher costs and testing delays could, they assert, severely hamper innovation. Smaller firms fear they may be driven completely out of business. And reduced innovation would not only hurt the domestic economy, it would diminish the U.S. chemical industry's competitive position in international trade.

There is also the question of confidentiality and protection of trade secrets. TSCA reporting regulations are supposed to provide protection but industry officials fear that the government's best efforts may not be good enough to prevent access to closed files and subsequent industrial espionage.

These concerns about costs and competitive effects extend to provisions in other toxics-related laws, such as the "cradle to grave" system of controlling hazardous waste under RCRA and OSHA standards. But in industry's view a more basic problem exists: Too many laws that are too complex are being passed too fast for even federal agencies, much less industry, to deal with. Industry officials blame Congress for overreacting to public pressure. At the root of much new toxics legislation, they feel, is a popular misconception about the relative impact of chemicals on the environment. For example, the American Industrial Health Council—an industry group—states that "the best estimate is that industrial chemicals have accounted for about 1 to 5% of all cancers." Another misconception, they say, is the idea of a no-risk society. Certainly risks and exposure must be reduced but the realistic concept of "acceptable risk" must be factored into government decision making.

Public interest group perspective

In contrast to industry, public interest group representatives see federal regulatory action as being too slow and—so far—ineffectual. Forward strides only seem to be made as a result of court action. For example, EPA's move to regulate 65 toxics in water was a response to a suit by the Natural Resources Defense Council. EPA was prompted to take action on developing the hazardous waste disposal regulations under RCRA after the Environmental Defense Fund filed suit.

In addition, regulatory action against toxic and hazardous substances has, for the most part, proceeded on a chemical-by-chemical basis. This is a slow and tortuous process. Public interest groups would like EPA and other agencies to speed up the process by adopting a "generic" approach to toxics regulation.

A generic standard would be a general regulation that current or new substances could be plugged into. In one scheme, substances such as known carcinogens—or suspected carcinogens—with similar toxic properties would be grouped together. Another related approach, especially for new chemicals, assumes substances with similar structure have similar effects. The generic regulatory approach has not gained much momentum, although OSHA and CPSC have floated separate generic proposals for regulating carcinogens.

Confidentiality is another controversial topic. Public interest groups feel that the public's right to know supersedes industry's need for confidentiality. They believe that, especially for new substances, the actual chemical name, not a pseudonym, should appear in the public record. In order for there to be an accurate third-party determination of potential harm to workers and the public, such information is vital. There are already very few avenues available for public participation related to toxics laws. The majority of the dialogue is directly between government and industry, and rigid confidentiality rules only close more doors. Public interest group representatives charge that industry is using the confidentiality issue partly as a smoke screen.

Finally, in regard to risk assessment and the concept of "acceptable risk," public interest groups are wont to ask: *Acceptable to whom?* and *Based on what criteria?* (For more information on the topic of risk assessment see LWVEF Pub. #341, *Of Mice and Men: Health Risks and Safety Judgments.*) Too often, they claim, the concern is for industry's cost while the benefit to the public of strict regulation (i.e., reduced health care costs) is not given proper weight. In addition, the preventive nature of strong toxics control has some inherent benefits—increased life span, avoidance of pain and suffering—that one may not be able to translate into monetary units.

Public response

Although controls are imperfect, it is encouraging to note that toxics problems are being addressed by public law. Unfortunately, the laws are usually passed in response to some major catastrophe. And the public itself has been so bombarded by toxics horror stories or media interpretations of cancer research that people still tend to feel vulnerable, confused and frustrated. It is no wonder people commonly believe that anything in large enough quantity will cause cancer. Actually, only a small percentage of substances tested have any mutagenic or potential carcinogenic effect (see box on Misconceptions).

Still, such a statement may be no comfort to those who fear they have already been unwittingly exposed to some carcinogen. And even if one is aware of the presence of a toxic substance (in the workplace, for instance) there may be no practical alternative—no realistic way to avoid exposure. So when the opportunity does become available to have a say in the toxics-control question, a public outcry for "zero exposure" is understandable. The public reaction to the siting of hazardous-waste disposal facilities is a good example.

The paradox of hazardous-waste disposal

Late one August night in 1978 a tank truck rolled along 210 miles of rural North Carolina back roads spreading an oily substance later discovered to be PCBs (see Toxics Sampler). Three New York men were subsequently charged with illegal dumping of a toxic substance. The roadside soil saturated with PCBs (all 40,000 cubic yards to be exact) was collected at great cost—but what to do with it? The governor of North Carolina proposed building a disposal facility in sparsely populated Warrenton County, but residents rose up in arms. One community leader went so far as to admonish the citizens to "stand up in front of the dump trucks and bulldozers and even give up our lives" to keep the PCBs out. Citizens had a good technical reason for opposing the facility—potential contamination of the high ground-water table at the proposed site—but most of the comments were, understandably, very emotional. If someone had attempted to discuss "acceptable risk" he might have found himself wearing a chicken-feather suit.

Proposed hazardous waste disposal sites in other states have met with similar public opposition. In fact, according to a report by the Government Accounting Office, the major roadblock to the building (and even the continued operation) of such facilities is public opposition—not economics, technical feasibility, government red tape or industrial recalcitrance. The irony is that properly designed and properly run facilities are desperately needed throughout the country. The lack of them just encourages more midnight dumping—an activity with infinitely greater potential harm to health and the environment.

A toxics sampler

The following information is taken from "Hazardous Substances" (EPA, November 1978), a report produced by the four federal agencies that have predominant responsibility to regulate toxic and hazardous materials—EPA, CPSC, FDA and OSHA. These selected substances were among a number identified by the agencies for priority investigation and possible regulatory action:

Acrylonitrile (AN)—a substance used in making acrylic fibers, synthetic rubbers and plastics. AN is a highly toxic material that may also be a human carcinogen and a teratogen.

Arsenic—a chemical used mainly in various pesticides and in the manufacture of glass. It is a notorious poison that in small amounts can cause dermatitis, muscular paralysis, and damage to the liver and kidneys. It is also a suspect human carcinogen and teratogen.

Asbestos—a mineral used in making such products as roofing, insulation, certain cement pipe, flooring, packing and gaskets, friction materials, coating, plastics, textiles and paper. Concern exists about asbestos in air, food and drinking water because it has caused cancer of the lung, abdominal cavity lining, intestinal tract and other organs among exposed workers as well as members of their immediate families.

Benzene—a chemical octane booster in gasoline, also used in the manufacture of numerous other chemicals. It has caused leukemia and chromosomal damage among exposed workers. OSHA has issued worker protection standards. OSHA and EPA are coordinating health research on the use of benzene in gasoline. More information is needed on its use in solvents.

Beryllium—a light metal used in the manufacture of rockets and airplanes, ceramic parts and household appliance circuitry. It may cause fatal lung disease. Long-term exposure may lead to heart problems, enlarged liver and spleen, kidney stones and cancer.

Cadmium—a heavy metal used mainly in electroplating but also in certain plastics, pigments and other products. It may cause kidney damage and emphysema. It is also a suspect carcinogen, teratogen and mutagen.

Chloroform and Chlorinated Solvents—Compounds used in numerous chemical processes and in dry cleaning and degreasing operations. The solvents may pose health hazards in aerosol sprays, paints, certain cleaners and pesticides. Health effects include depression of the central nervous system and heart functions, liver problems and possibly cancer.

Chromates—metal derivatives used in paints and pigments, fungicides, wood preservatives and corrosion inhibitors. These compounds are human irritants and corrosives, have caused skin ulcers and kidney inflammation in people and may be cancer agents. Chromates are also toxic to fish and other animals.

Coke oven emissions—smoke and fumes released by heating coal to produce coke for the iron and steel industry. These emissions have caused lung cancer and other illnesses among coke workers.

EDB—used mainly as an additive in leaded gasoline but also as a pesticide, a solvent and as an intermediate industrial chemical. EDB may cause cancer, reproductive damage and mutated genes.

Ethylene oxide—roughly 2.1 billion kilograms of this chemical are used each year mainly to produce auto antifreeze and other chemical compounds and also to sterilize medical equipment. ETO is a human mutagen and causes testicular damage. It is also an eye and respiratory tract irritant and skin blistering agent.

Mercury—a heavy metal used in electrical apparatus, in the preparation of other chemicals, in medicines and pharmaceutical products, paints and pesticides. Depending on the form of mercury, this metal can cause severe nervous system damage and kidney destruction.

PBBs—a flame retardant compound no longer made in the United States but accidentally mixed with animal feed in 1973 causing possible human illness and the destruction of thousands of farm animals.

PCBs—fire-resistant fluids no longer made in the United States but still widely used to insulate heavy duty electrical equipment. PCBs are suspect human cancer agents that also may cause nerve, skin and liver damage. They are widespread and long-lasting contaminants.

Radiation—energy rays from nuclear weapons fallout, medical uses such as x-rays and products like television sets. Exposure to high levels of radiation can cause cancer. The health effects of low-level exposure are uncertain.

Rational fear

Physiologists tell us that a certain amount of tension is good for our bodies. But too little or too much tension can be harmful. In the same sense, perhaps the public needs to develop what might be called a rational fear of toxics. A certain amount of skepticism is healthy. No expert in government, in industry or in a public interest group has all the answers (or even all the questions). But neither is defensive apathy nor automatic opposition to anything toxics-related necessarily the healthiest approach. Better public education about toxics (particularly carcinogens) is needed. More specifically, the average citizen needs simple, understandable, readily available guides for avoiding exposure.

At the same time, we must each put involuntary exposure in perspective with voluntary exposure to toxics. As Dr. Michael J. Halberstam, editor of *Modern Medicine* magazine put it, "There is responsibility enough for everyone."

Researched and written by Sam K. Sasnett, LWVEF Environmental Quality staff specialist.

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League of Women Voters Education Fund 1730 M Street, N.W., Washington, D. C. 20036 Tel. (202) 659-2685

memorandum

April, 1979

This is going on DPM

TO: State, Local and ILO League Presidents

FROM: Tess McNulty, Natural Resources Coordinator

RE: Enclosed new Current Focus: A Toxic Substances Primer

Toxic substances control is a particularly timely topic. There seem to be daily news reports of catastrophes, revelations of heretofore unknown toxic effects and discoveries of unsafe toxic substances disposal sites. Leagues that are interested in providing citizens with comprehensive and balanced information on toxic substances will find the Environmental Quality Department's newest publication, A Toxic Substances Primer to be an excellent resource.

Make this publication available to your Natural Resources and/or Environmental Quality Chair. Also contact local and state government officials plus other citizen group leaders.

A Toxic Substances Primer discusses a number of toxic effects such as carcinogenicity, mutagenicity, teratogenicity -- and explains with examples just what these terms means. It examines the many ways people can be exposed to toxic substances and makes a critical distinction between involuntary and voluntary exposure. A description of controls brings out a number of pros and cons about current government efforts and gives an objective overview of the concerns of both industrial and public interest groups. The Primer concludes with a section that calls for "rational fear" as a kind of enlightened public response to toxic substances problems -- a response that could fall somewhere between the most common reactions of "defensive apathy" and automatic opposition.

This Current Focus, along with upcoming publications to be produced under the LWVEF's new EPA sponsored solid waste public education project will be especially valuable for Leagues that become involved in the hazardous waste disposal issue.

H.B.

LEAGUE OF WOMEN VOTERS OF MINNESOTA
555 WABASHA • ST. PAUL, MINNESOTA 55102 • TELEPHONE (612) 224-5445

May 4, 1979

The Honorable Rodney N. Searle
390 State Office Building
St. Paul, MN 55155

Dear Mr. Searle:

We understand that the legislation to continue the operation of the Joint Legislative Committee on Solid and Hazardous Waste is being considered by the House. The League of Women Voters supports the continuance of the committee as an effective forum for consideration of the urgent problems in this area.

We also understand that the authorization for continuing the committee gives the Speaker the privilege of naming its members. Our concern for action on the solid and hazardous waste problems in Minnesota leads us to urge that the committee be continued intact with its existing membership. The problems in management of solid and hazardous waste are complex. The present committee has invested much time in attempting to understand the nature and scope of the problems and must now begin the investigation of possible solutions. Replacement of committee members could significantly slow progress towards urgently needed solutions as new members struggle to absorb the volume of material the committee has generated. The League feels the problems are too serious and the consequences of inaction too formidable to permit any delay in committee work. We feel continuity of committee membership would expedite solutions.

Sincerely,

Helene Borg, President
League of Women Voters of Minnesota

B:M

Same letter to Irv Anderson