

THE IMPACT OF THE U.S. EPA HAZARDOUS WASTE REGULATIONS:
PAST, PRESENT AND FUTURE

by

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Good morning. On behalf of Environmental Protection Agency's Administrator William K. Reilly I want to thank the Vancouver Geotechnical Society for providing EPA with this opportunity to speak to each of you. All of us have a stake in waste management which is starting to effect us on a greater scale every day.

I want to emphasize that what I'll be discussing today is not necessarily Agency policy. I am merely offering my own thoughts on the subject and they may not necessarily reflect the views of the Agency. Therefore, I don't know if I will cover the topic exactly as you might have expected.

ABSTRACT

When you stop to consider that hazardous waste is produced in the United States at the rate of 100,000 tons per day, and that's 260 million tons per year - enough to fill the kingdome in Seattle 1500 times over. It is not surprising that according to a recent Roper and Associated Press Surveys, the U.S. Citizens perceives toxic waste clean-up to be the nation's most pressing environmental issue.

Concern about this problem has been growing for well over a decade. It started off as a minimal concern on the extreme periphery of public consciousness. In the space of only a decade, however, hazardous waste management and disposal rapidly became a central concern of citizens in every part of the united states.

While the mission of superfund is to clean up mistakes of the past and to cope with emergencies of the present, the Resource Conservation and Recovery Act (RCRA) was designed to create guidelines for prudent hazardous waste management and disposal in the present and future. It was to provide the United States with its first tracking system for regulation of hazardous waste from generation to disposal. If we include similar requirements for solid waste and if fully successful, (RCRA)

should someday eliminate the need for a superfund program at least at the federal level.

THE PROBLEM

The hazardous waste problem has put America's ground water in jeopardy. Ground water is one of America's most vital natural resources. In urban areas, it supplies us with approximately 25 percent of the water we rely on for household and industrial use. In rural areas, largely dependent on wells, this figure jumps to an estimated 95 percent. In its unaltered state ground water is remarkably pure and is, to some extent, renewed by natural filtration through rock and sand. But years of unregulated hazardous waste disposal, careless public landfill methods, pesticide applications and other practices have taken their toll. The quality and safety of our ground water supplies near many waste sites are at stake.

Although it has been nearly 14 years since the passage of RCRA and nearly 10 years since the Superfund law was enacted America's hazardous waste management and clean-up efforts have only begun. We still have over 1200 sites that await clean-up under Superfund at an estimated cost of \$30 billion dollars. There are roughly 30,000 additional sites that may also require clean-up either by the states or federal government, which would bring the total into the hundreds of billions.

Clean-up of sites has proved to be a slow, often combative task, so technically difficult and expensive that already have led some to question "how much can or should be done?" And can we under RCRA realistically monitor over 100,000 hazardous waste generators, and more than 5700 treatment, storage and disposal facilities with present federal and state resources?

Then there is the problem of small businesses who are responsible for many contamination problems because they can't afford to pay extraordinarily high unit disposal cost, and they often lack sufficient technical or regulatory information.

THE HAZARDOUS WASTE OMBUDSMAN

These are some of the issues that I will briefly discuss with you today but, first of all, I guess I should answer the question what is a hazardous waste ombudsman? The American Bar Association definition describes the position as held by an independent government official who receives complaints against government agencies and officials from aggrieved persons, who investigates, and who, if the complaints are justified, makes recommendations to remedy the complaints.

The EPA Hazardous Waste Ombudsman is the first federal level position of its type that fits the classic Swedish model of an official appointed to a fixed term by the legislation.

While EPA is always striving to reduce the number of complaints it receives, a small percentage of the general public and the regulated community continue to experience problems in getting information concerning hazardous waste management. The objective of the Ombudsman is to ensure that the general public has somewhere to turn when all else fails. However, the Ombudsman should not be used for problem solving routinely, but rather, as a last resort.

The idea of a citizen or member of the regulated community submitting a complaint and EPA's establishment of a formal complaint program is not necessarily an indication of fault. Quite the contrary: the establishment of an Ombudsman is indication of an enlightened, confident agency.

The creation of an Ombudsman is a strong indication that EPA is willing to take risks, innovate, delegate and seek solutions that don't have clear answers within the existing frame-work of the agency.

The underlying idea of the legislation is that many citizens and members of the regulated community either do not know how to get information, or feel frustrated in their attempts to cope with the complexities of the hazardous waste program. Some of these requests for information are routine and are normally handled by RCRA/CERCLA hotline. However, some requests are more complicated. They reflect concerns about the way the regulations or programs have dealt, or failed to deal, with their situation or problem. Assisting with the latter is the role of the Hazardous Waste Ombudsman. The difference between our office and other offices is that our office always returns phone calls.

It is important to note that the Ombudsman tries not to be an "advocate" for the agency or the public. He is not a substitute for the normal appeal processes. The Ombudsman must function as a supplement to existing institutions in the hazardous waste program - not as a replacement. The Ombudsman and the program managers are both seeking the same end - to improve understanding of the requirements of the complex hazardous waste legislation.

The Ombudsman's role is part fact-finder, part investigator, part systems analyst, part judge, part conciliator, and, if necessary, part advocate for the citizen. Required is a person with thick skin, good ears, determination, and persistence. It is a demanding job since it often involves dealing with difficult

issues and difficult people on both sides - complainant and federal official.

What does this mean I do?

Well, I facilitate, I mediate, and I negotiate.

Let me give you a simple example of what I mean.

We recently had a case involving an industry association that had filed a petition with the agency concerning the development of guidelines for the federal procurement of used oil. Five months went by and the petitioner had still not heard a word regarding his petition. Was anybody working on it? Was there a decision regarding his request? When would he know something? The petitioner had previously had problems contacting the agency for the status of issues so he called the Ombudsman. I found out that the case had been received by the program office and a decision made. The case had then been referred to the legal department for concurrence, unfortunately with little explanation regarding the program's decision attached to the case. The legal staff expected the program office to let them know what the technical issues were and the program staff were waiting for the legal staff and nobody was serving the petitioner.

By contacting the legal department and the program office we were able to facilitate the assembly of a response to the petitioner. I let the petitioner know verbally what was going on and informed him that a letter would be sent to him providing him with the details.

We employ the "self-correction" method of problem solving. This involves encouraging line staff to iron out the complaints at their level, and allows program staff to correct the problem without feeling that their work is being criticized. We try to achieve equitable/reasonable/mutually agreeable solutions.

Then there was the National People's Action of Chicago. They held their 17th annual convention last year here in Washington, D.C. I was asked to represent EPA. This organization's major focus is on low-income housing and issues which they believe affect millions of neighborhood grass roots people throughout the nation. They requested EPA to participate in a workshop on the issue of toxics in the environment.

They raised a number of concerns about municipal solid waste landfills that were not on the national priority list, but were nonetheless bad actors.

They pointed out that the present non-existent or weak federal and state solid waste regulations and the infrequency of well maintained municipal solid waste facilities contribute to the public's justifiable wariness of having one of these facilities as a neighbor. When these citizens say "not in my backyard" or "nimby," the landfill can cry back. I was here first. Their concerns are based on living with this situation every day.

There are about 1,940 operating municipal solid waste landfills nationwide as of 1988. Of these, 249 were on the Superfund national priority list as of June, 1988 and 116 have designated as requiring cleanup under state hazardous waste programs. But, a number of the problem landfills continue to operate. In fact, I recently received a complaint from the National People's Action complaining that one of these problem landfills was being expanded. They asked us to look into it.

The Ombudsman has become a vital part of life for those citizens who do not have money, or expertise to challenge an administrative decision. These groups, that represent the least of us, are a major segment of the citizenry that contacts the Ombudsman for help. To the people, the environment isn't just forests and wetlands, the environment is where you live. They believe that the housing crisis should be considered an environmental issue.

A hazardous waste generator called really annoyed about a sixty page questionnaire, yes 60 pages, he received from EPA. Fortunately, it was not our office. We contacted the correct office and had them return the call to the complaintant and take their own heat.

Confrontation and ignorance are the enemies of good environmental protection -- whenever possible, EPA makes use of negotiation among all affected parties to find acceptable solutions. The agency consults widely and taps into the knowledge and insights of the public.

The Ombudsman received two calls about gasoline and water mixtures. One was concerned with the legality of transporting this mixture; the other was concerned with the cost of disposal of the gasoline and water mixture. We responded to the first request by familiarizing him with the joint EPA/Department of Transportation regulations for transportation of hazardous materials. The second caller had received an estimate of \$1,000 to dispose of the mixture, (he had several drums) and gasoline and water mixture is considered a hazardous waste in his state. He thought the cost was excessive and wanted to know if we had any cost comparisons. We did not have any but told him it was

usually based on distance to the disposal site and the estimate that he had been given could well be very reasonable. He stated that he should pour it down the drain. I explained that this could be dangerous particularly at the local waste water treatment facility. Also that gasoline has fingerprints because the octane and other additives are different for different brands and they could probably track it back to him. He made some disparaging remarks and hung up.

There are, of course, some risks in having an Ombudsman program. First, such a program is expected to provide at a minimum verification of the latest rumor on the hazardous waste grapevine. Chasing rumors can create an alternate system of supplying information and thereby weaken the normal process.

Sometimes by being responsive actually encourages people to bypass the system. If the Ombudsman gives the impression that a citizen can get quick information they will come to me first.

Issues involving public health and environmental questions are particularly disturbing. I received a chilling call from a nurse from the hospital where she worked and she was crying. She said that her parents purchased some property two years ago and that the previous owner of the property had stored PCB and agent orange. Her mother died of liver cancer last April and that her father discovered he had the liver cancer this past January. Can the Ombudsman help?

RISK ASSESSMENT AND RISK MANAGEMENT

There's a lack of public understanding of risk assessment and risk management.

I think government, industry, and the press can all share the blame for this situation, because we have failed to effectively communicate the nature and true extent of the risks.

Many people now demand assurances of nothing short of zero risk. You and I know that we simply can't give those assurances, particularly in a highly industrialized society such as ours.

Don't misunderstand. There are very legitimate public concerns about hazardous waste, but they're being clouded by unfounded fears and an almost hysterical obsession by some people about the dangers of chemicals.

We need to better communicate when the risks are real and when they are not, and put risk from chemicals into perspective with the hundreds of other risks we encounter every day.

One community became very upset when they heard that exposure from emissions from an incinerator could double the risk of getting cancer and rightly so. They were less upset when they learned further that their risk was doubling from one in ten million to two in ten million.

I mentioned this to a group of graduate students at Oklahoma State University and one student said to me that, "this risk-based decision making sounds like the lottery-except that when you win you lose." This brings to mind one of my favorite stories about lotteries that I think may illustrate the kind of thing we are up against in being an Ombudsman. A man had a very famous race horse, and a friend of his had tried several times to give him fifty thousand dollars for the animal; but the owner would not sell. The friend kept pressing him and still he would not sell. But one morning he got up and went to the stable to check on his horse, and there the horse lay dead on the floor of the stable. The man rushed to telephone his friend, and said, say, do you still want to buy my horse for fifty thousand dollars?" And the friend said, yeah, I sure do. Ok, he's yours, he's here, bring me a certified check. Well, they concluded the transaction. About a year later the man saw his friend again, he said, "tell me what your feelings were when you went to pick up your horse and found him dead." Well, the buyer said, "I confess that I was a little bit upset at first, but I decided that I would raffle him off, and I sold 150 chances on that horse at a thousand dollars apiece. "My goodness said the man who had sold him the horse, I would have thought they would have all complained." Oh, no, just the one man who won complained, and I gave him his money back.

UNDERLYING CAUSES OF THE PROBLEM

I want to use my time with you today to talk generally about the hazardous waste dilemma -- a problem, that, as you know, is getting worse, not better. I want to mention some of the causes and implications of the problem and lay out some of the Agency's possible solutions.

It seems as if we're approaching a crisis point in dealing with the generation and disposal of hazardous waste. The fact that the Vancouver Geotechnical Society's Annual Symposium major focus is on geotechnical aspects of contaminated site characterization and remediation indicates that the concern is international.

Every year, the United States produces at least 260 million tons of hazardous waste - more than one ton for every man, woman, and child. This isn't surprising. After all, we're a nation which has learned to rely on the benefits of the chemical

industry. Today, foods, medicines, building products, pounds of organic chemicals manufactured every year in the United States.

At the same time we haven't adequately anticipated the effects these chemicals could have on our health and on our environment. Today we're paying the price for that lack of awareness.

To date, EPA has identified more than 30,000 potentially hazardous sites across the country. Unfortunately, the total could be much higher. Meanwhile, cleanup costs at federal superfund sites average nearly \$21 million per site.

This is all unfolding against a background of action that has limited our disposal options even further under the 1984 amendments to the Resource Conservation and Recovery Act. These amendments severely limited the use of land disposal as an acceptable option by placing strict requirements on some forms of land disposal and completely banning others. We learned that over 80% of the nation's 260 million tons of hazardous wastes were being disposed of on land by the very methods that created most of our superfund sites. In other words, land disposal is guilty until proven innocent.

The amendments also greatly expanded the regulated community by adding requirements for at least 100,000 small quantity generators. These are small business that generate more than 100 kilograms of hazardous waste per month. This change has increased the amount of waste that will be dumped into the commercial waste area. Small quantity generators are finding themselves increasingly unable to dispose of their waste as they did in the past. For example, it only takes a few drums of cleaning solvent to contaminate the ground water supply for a whole town as many towns have found out. In some cases, 99.9% compliance with hazardous waste disposal laws is not enough. In order to protect public health and the environment we need 100%. Small businesses are responsible for many contamination problems because enforcement is difficult because of their numbers. They also must pay extraordinary unit disposal cost, and they frequently lack sufficient information both technical and regulatory.

NOT IN MY BACKYARD

We see the same debate about health issues time after time when the need to site a facility of any kind arises. The need for these facilities increases as time goes on, but the "nimby" syndrome is virtually halting progress on waste disposal and storage and incineration in all parts of the world.

You may remember the odyssey of the Khian Sea and The Bark, two ships bearing Philadelphia waste incinerator ash. The Khian Sea dumped about 3,000 tons on a Haitian beach. They told the Haitians that it was top soil ash fertilizer.

Then there was the Nigerian government, stunned by reports that highly toxic waste from Italy had been dumped in the Nigerian port city of Lagos, the city seized an Italian ship and told Rome that if it wanted the ship back it had to haul away the waste.

I know that these days taking hostages is not any longer a rare event, but for toxic waste this was a new development. The hostage approach to waste removal has emerged as part of an Africa-wide alarm about "toxic-terrorism."

Some West African countries rank among the poorest in the world, and have been offered fees as low as \$3.00 a ton. They admit that the offers have been tempting. Officials of Guinea Bissau signed a five-year contract 2 years ago to bury 15 million tons of toxic waste from European tanneries and pharmaceutical companies. In return Guinea Bissau would receive a yearly payment of \$120 million.

Two thousand miles to the south the Congo government officials signed a contract to store a million tons of chemical waste from Northern Europe in return for \$84 million. U.S. House of Representatives John Conyers, Michigan, has introduced a bill to prevent toxic-waste dumping in Africa and the Third World.

Finally on the subject of not in my backyard, someone at EPA had a wall-poster that read:

NIMBY.....Not in my backyard
NIMFYE.....Not in my front yard either
NIMEY.....Not in my election year
NIMTOO.....Not in my term of office
LULU.....Locally unavailable land use
NOPE.....Not on planet earth

POLLUTION PREVENTION

We have to begin to explore every available option. If we fail in that responsibility, somewhere down the line, we'll be forced to choose from fewer and less desirable alternatives.

We need to consider pollution prevention at the source. Through changes in manufacturing processes or product design, introduce waste reduction initiatives. Congress sent a clear message in the RCRA amendments. We must move away from land disposal and toward waste minimization. This idea is gaining

more and more support among environmental experts, and with good reason. To date, this country has focused its efforts on the disposal end of the pollution problem, pursuing minimization of waste generated only through indirect incentives. Now it's time for us to look at ways to directly cut down the volume of hazardous waste produced. The benefits could be enormous.

In a recent article in the EPA Journal, Joel Hirschorn of the Congressional Office of Technology said "preventing pollution is like preventing disease by changing eating habits and lifestyle; pollution control is like using medicine and surgery to minimize ill effects."

Being a fellow who must watch his cholesterol, I think that is an excellent analogy. In fact Hirschorn thinks that with successful research and development we can eliminate 75% of all current waste discharges and emissions within the next 20 years.

What about recycling. We must be careful with certain types of recycling. Recycling created the hazardous waste cleanup problems at Times Beach. This is a small town in Missouri that EPA had to purchase because a fellow applied used oil laced with dioxin as a dust suppressant on the town's unpaved roads.

I believe that there are a number of positive aspects to recycling. It has helped remove bottles and cans from the streets of a number of our large cities; and it has produced a greater awareness of environmental problems among the citizenry, particularly school age youngsters. However, the market does not appear to be there just yet for used oil, plastics and newsprint.

The distinction between recycling and treatment often overlaps; for example, in some cases incineration is considered recycling. The facilities that handle recycling accept solvents, oily waste, acids, caustics, wastes containing metals, cyanides, sludges and solids, pesticides, lead-acid batteries, mercury and other wastes.

The cost of recycling varies widely. Recycling firms are paying \$5.00 a ton for newspapers. Generators of used oil must now pay between \$0.20 and 0.50 cents per gallon to have it picked up, whereas a few years ago recyclers paid generator for used oil. Used oil is a hazardous waste in California and several other states but is not yet defined as a hazardous waste by EPA. Contaminated solvents requiring incineration can cost as much as \$900 per drum.

In California they have a labeling program to help consumers identify environmentally beneficial products similar to the programs in Canada and Europe.

But, there's no question that pollution prevention can work. Unfortunately, however, we're still too far away from a comprehensive national pollution prevention program to rely on it as the immediate solution to the hazardous waste problem. This option has to be vigorously pursued.

There's also a need to remove the technical, institutional, and political obstacles which block the use of alternative technologies to clean up Superfund sites.

The United States plans to be at the forefront of transferring waste management technology to developed and developing countries. Environmental protection should be on par with defense as a foreign policy objective.

The Agency is currently working to identify Superfund sites that are particularly good candidates for innovative approaches and work with the affected communities from the beginning.

Another solution worth pushing at this stage is mobile incineration and other on-site waste treatment systems at Superfund sites. We think this could be one of our best hopes for minimizing public opposition to siting, as long as we can assure residents that, once the remediation is completed, the mobile incineration unit will, in fact, be removed from the site.

With the restrictions on land disposal, it's absolutely necessary for us to explore and develop alternative waste treatment methods that make effective use of all available chemical physical, and biotechnology processes which must be a prime form of waste destruction. This is where our R&D efforts are really going to pay off down the road.

CONCLUSION

As the Hazardous Waste Ombudsman I've seen in the last year alone a dramatic change in expectations and how we are approaching the waste management problem.

Many in debating Resource Conservation & Recovery Act (RCRA) reauthorization are talking about how its time to develop a comprehensive National Waste Management System -- well, I think that is entirely appropriate. We've been through a decade of constant change and I think we have the experience now to define the Waste Management System. But, I would submit that we are not just talking about it -- we're already creating such a system. Most of the activities underway in RCRA right now are contributing to that system.

The scope of the system is expanding very rapidly -- not only in the area of so-called Subtitle "C" Hazardous Wastes, but also in terms of the number and types of wastes. We are also embarking on a fundamentally different approach to regulating and managing those wastes. We're no longer simply concerned with imposing technical standards at units that treat these wastes -- we're concerned with the types of technologies used and even more importantly we're becoming increasingly concerned with production processes that are producing the millions of tons of wastes in the first instance.

We are now working on new regulations - one of which is called organic toxicity characteristic which will bring in additional waste streams. We have proposed a list of wood preserving waste streams and are working as rapidly as we can to do the same thing for the petroleum industry and we will continue to add to the base population of the hazardous waste universe.

Now let's look at the major new area:

Solid Waste Program - All solid waste is not just garbage

What do I mean by a Solid Waste Program -- a program that includes many diverse types of waste that often are unique wastes that merit some sort of special management

Today this includes many categories

Municipal Solid Waste - 6,000 landfills
on our way to over 300 incinerators

Medical Waste - with its millions of handlers

Household Hazardous Waste -- major incinerators
for the large volume wastes from oil and gas
production

Mining Industry and the Utility Industry. This
huge volume would swamp our hazardous waste system,
the industrial arena of 27,000 facilities managing
waste which is not hazardous at this point but
would dwarf our current program

Clearly the scope of solid waste has already changed. There will be an increase in amounts of waste and numbers of facilities under federal waste regulation in our future.

CATEGORIES:

Now, let's look at how we're changing our approach

Remember -- I said that we're not just expanding the scope of how we regulate -- we're changing how we regulate

Why? -- We simply produce too much waste in this country

- It causes pollution
- It causes health and ecological problems
- It is an incredible waste of reusable resources
- It costs enormous amounts of money on the front end and the back end
- It creates a situation requiring American industry to manage their waste better
- State/Local/Federal Governments have to regulate, permit, inspect, enforce better
- We know we have to stop producing so much waste --

PROGRAMS ARE BEING DESIGNED TO DO JUST THAT. The three "Rs" for the nineties are: Reduce, Reuse and Recycle and safely manage what's left after that.

This approach is at different stages of formulation and evolution within both the government structure as well as in our technological ability to implement.

More specifically in the Hazardous Waste Program; over the last few years we have exerted extraordinary pressure on those who continue to produce hazardous waste. That pressure will continue to grow making costs of producing waste more and more expensive and making looking at production process changes much more attractive and economical.

In addition to Superfund liability - there are some major RCRA regulations. Let me highlight a few of these that are either in place or soon will be:

1. Before the end of this year -- Placement of untreated wastes on land will be illegal -- in a nation that only 5 years ago had 1700 land disposal facilities for hazardous waste authorized to operate and we now have 250

By 1992 all national extensions on landfills without prior treatment will run out

2. Also by 1992 EPA and states will have made final determinations on whether most of the 6,000 treatment storage and disposal facilities can continue to operate or must close
3. By next year we expect to issue our location standards This means major restrictions on waste management and where it may occur
 - Flood plains/wetlands, fractured karst and certain types of geological formation and other sensitive locations will be off limits
 - There will be bans on new facilities and closure of all technology if they are not able to meet the specifications demanded by these locations standards
 - This will apply to all modes of Waste Management Systems now in place.
4. Major amounts of one-time generation of waste which are a consequence of Superfund or RCRA cleanup. Under current law if these wastes are hazardous all RCRA Standards including the ones I just mentioned will apply.
5. All of this puts pressure on capacity in addition to increasing costs of Waste Management:
 - Will we have enough capacity including treatment in 1992
 - The question is very difficult to predict -- but we are on our way to finding out
 - For the first time States are in the process of predicting the adequacy of Hazardous Waste Management capacity for the next 20 years. Pursuant to the recent Superfund Amendments Capacity Assurance Program, 51 States have submitted these capacity documents to EPA.
 - This will give States a good sense of capacity shortfalls -- and a good sense nationally for EPA on how we stand.

- But perhaps even more important -- it will give us information on planning for waste minimization program. This along with industry data recently submitted in RCRA Biennial Reports is going to begin to tell us where waste is and is not being minimized.

This I think will give us excellent information to understand which industries are minimizing and which are not -- for those that are not -- we can look at why -- to see if technical and economic barriers exist and what can be done to overcome these barriers.

NOW A FEW ADDITIONAL REMARKS IN THE SOLID WASTE AREA:

1. To put the problem into perspective, we as a nation produce about 160 M tons of garbage every year. It is projected that we will be up to 200 M by the year 2000.
 - There are some major new efforts at EPA including a recent released agenda for action issued several months ago
 - And quite honestly the major thrust is source reduction
 - We have established a 25% goal for 1992
We are working on products to reduce volume and toxicity

We are working on ways to produce a better infrastructure for the purpose of separation of refuse at curbside and separate pick up and recycling. Europeans already recycle about 25% of their trash. But Americans only recycled about 10% last year.

- We discard enough aluminum to rebuild our commercial airfleet every three months.
- We throw away enough iron and steel to continuously supply the U.S. automakers.
- We discard 18 billion plastic disposable diapers annually.
- We go through 2 million plastic bottles hourly.
- We discard 24 million tons of leaves and grass clippings each year.

- We discard 220 million used tires each year, one for each person in the United States.
- We throw away enough glass bottles and jars to fill the 1,350-foot twin towers of New York's World Trade Center every two weeks.
- 2. Now, let's turn to Medical Waste which you have heard a great deal about recently. We have (a new pilot program for packaging, labeling and tracking). The rule was issued last year, and allowed various states to determine if they wish to participate in the program. This is only the tip of the iceberg. Medical Waste is part of the Solid Waste Program. It is a contributor to the flotable question; and the problem of combined sewer overflows; and a contributor to the major elements of the plastic disposal problem that confronts us with the problem of thermal destruction of municipal waste, and a potential contributor to the metallic contents of municipal ash; and in and of itself a difficult complex political and technical question.

SPECIAL WASTES such as mining waste and toxic incinerator ash are also highly political issues currently under study by EPA to decide whether they belong in hazardous waste landfills, or in the Subtitle "D" our Non-Hazardous Program which we are calling D+.

In a few years we will have a better understanding of what is left.

- New notification system that will tell us where/what they are
- The question is what to do with the rest
- To me that presents EPA with a unique opportunity to design a program of pollution prevention from its inception whose fundamental regulatory approach is one of source reduction and recycling
- Unlike hazardous waste laws -- which are an entrenched program -- EPA intends to explore to the maximum extent approaches that will at the outset require industry to have as its priority sources reduction and recycling

WHAT DOES ALL THIS MEAN FOR THOSE ENGAGED IN RESEARCH?

1. We'll continue to need basic research in hazardous waste, and other industrial wastes.
 - New treatment -- not just for ongoing waste management but also for cleanup technologies; especially those that are mobile, and those that can be applied in a stationary setting
2. Improved methods for ecological assessment. The Agency has concentrated the majority of wastes regulations based on Health Risk. This is changing very rapidly. We don't have good enough techniques for ecological assessment. We need to continue to develop in this area for our waste cleanup programs
3. Waste Minimization:
 - Production processes that are environmentally sound, produce less waste and are cost-effective. We will be looking to see if companies are taking waste minimization seriously. Otherwise it is going to be too expensive to manage waste in the United States

As you can see, we have an enormous job ahead; but we've made tremendous progress in the last ten years. A few years ago we didn't even know what wastes were out there or where they were -- now we do. We have had a cradle to grave system -- that has moved to waste minimization and waste treatment but, -- the scope is growing and our fundamental approach to pollution control in the United States will change. It's a lot of work for all -- but it's going to be an exciting time too -- a time for creating and innovation -- in policy, in law and in science and technology.

The obstacles we face are imposing and can't be taken lightly. We need creative solutions.

Woody Allen said, "more than at any other time in history, mankind today faces a crossroad. One path leads to despair and utter hopelessness. The other, to total extinction. Let us pray we have the wisdom to choose correctly".

Well, I take a considerably less pessimistic view than most people about the hazardous waste problem, but I think there should be no doubt that it is a problem that is real and growing.

But, we must address the public fears both those that are well founded and those that are not

Perhaps with a public that is a little bit more informed, a little bit more savvy on these issues, we'll be able to make some headway in the search for solutions.

Lawrence Peter, the educator who coined the famous Peter Principle, said that "democracy is a process by which the people are free to choose the person who will get the blame". And right now, people are pointing fingers at both industry and government.

Consider my final vignette that I believe applies to us here today. We had a janitor that cleaned the offices at our lab in Athens, Georgia, named Clarence. Some of the researchers at the lab enjoyed tinkering with didactic gadgets. Well, one fellow had purchased the most difficult Rubik's cube he could find. He toyed with it for weeks but could never match more than three sides. Finally, in disgust he left it on his desk one day and went off to a meeting. When he returned about an hour later, Clarence the janitor had matched all the colors on the cube. Stunned, he said, "Clarence! How did you do that? I've been working on that for weeks and couldn't get it." "Well", Clarence answered, "I don't have much education and so I can't get a lot out of books. I have to do it the old fashioned way. I have to just think my way through it.

At any rate we have the opportunity at this symposium today to think our way through it.

Let's make the most of it.