

## **IX. At Whose Expense?**

## ● At Whose Expense?

One of the most disturbing manifestations of our society's yen to see everything in dollar terms is the common practice of making decisions about health and environment in which the alternatives are figured on the basis of cash equivalents. *Cash on the barrelhead. For what it's worth. Dollars and sense.*

The Environmental Impact Analysis (EIA) requirement of the 1970 *National Environmental Policy Act* (NEPA) gave jobs to a lot of professional risk assessors, college-trained specialists (many direct from business schools, many in the employ of businesses pushing for approval of environmentally risky projects) who in relatively short order programmed the EIA process, streamlined it, so that alternatives (as in insurance policies) were determined by setting monetary values on ecological systems, on living beings, including people. People's health, the length of people's lives, ecosystem health, community sustainability, get figured against projected loss or gain of corporate income or budgets of government entities—all based on a plethora of assumptions, choices made in despite of significant unanswered questions, decisions almost always determined with a bias toward increasing private profits. Non-human health calculated in terms of resource commodity models.

Whether or not to spray toxic pesticides on an urban environment, whether to allow toxic discharges to air or water or land, decided on the basis of profit margins of a particular business or industrial sector. Whether or not to allow pollution determined on the economic status of particular demographics, which is calculated in comparison to other particular demographics, with the result that hazardous waste dumps and incinerators are typically located with government sanction in low-income communities inhabited by people of color. Whether a person will get the best available medical treatment for her ailment determined by how much she is able to pay. The EIA process as interpreted by the President's Council on Environmental Quality (CEQ) spread rapidly from federal to state and local processes via the rules for agencies using federal funds, and under Reagan the CEQ itself was re-gear'd to favor the corporate agenda.

The stalking-horse for many environmentally-destructive activities was and continues to be the statistical/probabilistic method known as risk assessment. *Risk analysis, risk assessment, hazard assessment, risk management, reasonable risk, acceptable risk, qualitative risk, qualitative risk, negligible risk, comparative risk* suggesting ominous analogies to the *collateral damage* rhetoric of the Vietnam police action. The collapse of decision-making into various versions of cost-benefit analysis by business and government numbers-crunchers during this period across a wide range of public health and environmental fields became one of ATI's main focuses. *How many ppm will it take to kill how many people and how long will it take? Acceptable to whom? Reasonable by whose account?*

Objectivity in any field is problematical, bias in risk assessment is all too easy. The methods are arcane to begin with, the calculations complicated, the figures easily juggled. It was (and to some unconscionable extent still is) common practice for public agencies to accept for their analyses calculations cooked up ("interpreted") by interested parties, or by agency personnel in "swinging-door" relationships with those parties, the degree of coziness between agency and business often depending of which politicians and parties hold sway at the moment. In my experience, both major parties have been profoundly pro-business, pro-growth and pro-development, with the Democrats more inclined to include environmental protection (usually in the form of "mitigation" or "restoration" rather than prevention).

Outright fraud is not uncommon. In the late 70s, for instance, Industrial Bio-Test, a company that had produced chemical assessments on hundreds of chemicals for private and governmental

entities, was convicted of laboratory fraud, resulting in hundreds of health and environment risk assessments and resultant government policies being withdrawn, including Forest Service and BLM pesticide spray programs nationwide. Ethics has since become a topic of ongoing concern in all fields of science, a required course for science majors, but despite increased oversight in professional journals and in corporate, academic and government labs, instances of scientific fraud are all too common. Lies, damned lies, and risk assessment.

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In the 70s and 80s, toxics activists were prominent among those who spearheaded the environmental justice movement, bringing ethical issues of risk assessment into the political world. In Arizona in the late 80s and early 90s, for instance, the decision of the state to permit a hazwaste incinerator in the small, economically-depressed, predominantly black community of Mobile (south of Phoenix) became the occasion for the largest and most clamorous environmental protests in the state's history—resulting in eventual denial of the company's permit and passage of comprehensive, comparatively progressive, hazardous materials and hazardous waste laws and regulations.

A main leverage point for many of our efforts throughout the last quarter of the 20<sup>th</sup> C was the recently-discovered finding that toxics can cause death or debility at doses previously too low to detect (*ppt*, parts/trillion), by routes, at times, and through mechanisms previously unconsidered or considered insignificant (e.g., transgenerational and hormone-mimicking effects); the fact of linear effect: exposure to one molecule of a substance at the wrong time at the wrong place enough to cause cancer and other genetic diseases—and, said toxics activists, enough to require that legal exposure to the substance be reduced to zero.

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Two more Maryvale kids dead of leukemia.  
In Tucson they're trying to suck the TCE down  
to "acceptable" levels. In Kingman it's poison gas plants.  
In the San Pedro, nitrates at Apache Powder  
sulfates at Bisbee Junction. In Goodyear, chromium.  
Up on the rims of the Canyon, up on the Strip, down  
at Twin Buttes and next door at the WIPP site it's  
uranium again despite the Rio Puerco  
still hot as hell from mill tailings spilled in Gallup  
back in the 70s—not to mention Chernobyl,  
TMI, Navajo miners dead and dying,  
the tests they ran on babies, draftees and everyone else  
downwind (seeding clouds over several states  
to see where and in who and in what quantities  
it would show up). And meanwhile, back on the farms  
in Mesa and Yuma the DBCP still there in the wells  
to shrivel the balls of migrant workers. The fish downstream  
from the Phoenix wastewater plants and them old cotton fields  
rotten with DDT, metals and dioxin.

And then they tell us the new hazwaste incinerator,  
even with the subsidies, can turn a profit

only if we let them burn out-of-state wastes.  
Talk about Gross National Product: they think  
even toxic waste should be a growth industry.  
Put that in your smokestack end-of-the-pipe dream,  
weigh it against the growing national deficit,  
the growing number of badges, busts and privatized jails,  
the growing jobless homeless hopeless sickness rate,  
the growth in exemptions from uncle's infernal revenue organs,  
the growing gap between the filthy rich and the rest of us.

“Two More Maryvale Kids”  
Mr America Drives His Car

## Getting Serious about Pollution Prevention: Risk Assessment vs. Public, Occupational and Environmental Health (1990)

Michael Gregory, presented to the Society of Prospective Medicine 26th Annual Meeting, Mesa, Arizona (20 October 1990)

As you heard Dr. Kligman say in introducing me, my background is not technical, so I am particularly honored to have been invited to address this organization and to share the podium with such distinguished health professionals as Drs. McKinnon and Pike.

Although I spent my first two years of college as a physics major, the degrees I ended up with were in the humanities, and the last academic studies I did were in the dialectics of language and the literature, folklore and mythology of the ancient and medieval Indo-Europeans. Somehow all of that didn't seem too relevant while we were bombing Cambodia, when I dropped out of my doctoral program.

Now, as an environmental activist, I find that knowledge of semantics and folklore has a great deal of relevance, especially when dealing with topics like risk assessment, which bring into sharp focus the myth of scientific objectivity. Even so-called "pure science" does not take place in a vacuum or an academic ivory tower, but must be carried out in the real world. It has to be seen in political, fiscal and psycho-social contexts. Risk assessment is not at all pure, but is applied science; the main difference between the two being that applied science is bought and sold, which means that in practice, if not in theory, it has a human side, and involves questions of public policy, law, and things like civil, human and natural rights.

These matters are far too important to be left up to technocrats and bureaucrats, so I'd like you for the next few minutes to take off your hats as scientists and technicians and health professionals, or as representatives of industry or government or whatever, and put on your public citizen hats.

I'll start by stating several premises that underlie most of the rest of my talk, and that I think get to the heart of the debate about risk assessment. First premise: we have a right not to be poisoned. Second, we have a right to know if we are being poisoned, and if so, by what, by whom, and for whose benefit. Third, we have a right not only to know, but to *say* no to the poisoning. And fourth, no additional risk is acceptable if it is unnecessary and avoidable.

I think those statements sum up much of the dissatisfaction the public feels today about the way industry and government deal with the environment and indicate some of the ways the so-called science of risk assessment bumps heads with policy concerns about so-called non-scientific things like civil rights and quality of life. Central to an understanding of this conflict is the concept of "acceptable" risk and the role of risk assessment in deciding what risks are, or are perceived as, acceptable.

Rather than addressing this fundamental public concern, industry in general today is going in the wrong direction. Instead of going for serious reduction of risk and trying to satisfy the public's concept of what is acceptable, companies instead are putting huge resources into *managing* risk, and, what's worse, trying even harder to manage the public's *perception* of risk, trying to get the public to lower its acceptability thresholds. "There is no real problem," they seem to be saying: "risk is in the eye of the beholder." Risk management devolves all too easily into a marketing strategy for modifying consumer behavior and it's on with business as usual—which is to say, polluting business.

### ***What's Wrong with Quantitative Risk Assessment?***

While medical risk analysis is generally prospective, directed towards finding out how lives may be saved, environmental risk assessment is primarily concerned with figuring out how many of us are expendable. It provides a very poor basis for policy and regulatory decisions. Not only is "the estimation of health consequences of pollution. . .still poorly understood" (Webster and Connett 1990), but "any desired estimate of risk can be produced by risk assessment depending on value-laden assumptions in the model, selective use of data, and estimates for factors for which insufficient data exist" (O'Brien 1990). As Dr. Paul Connett, one of the world's leading authorities on waste incineration, said on another panel I was on just last night, risk assessment as it is practiced in the real world "is a pseudo-scientific rationalization for a political decision already made" (Connett 1990).

Typical risk assessments are based on the assumption that carcinogens are no-threshold genetic toxins (i.e., the lowest possible dose—even one molecule—can cause cancer) and that, therefore, a linear model can be used to extrapolate data from high-dose response animal tests to real-life low-dose human exposures.

But, in fact, such "one-hit" and linear models, including EPA's usual 3-stage (high-, medium-, low-dose) linear model, even though they have built-in mathematical biases towards overestimation of risk, and even though they are the most conservative of all models in general use, nonetheless "often" underestimate risk to humans (Bailar et al 1988).

Bailar et al (1988) point out "six plausible reasons for expecting a one-hit formula to give nonconservative estimates of risk. One plausible reason is that intervening mechanisms may skew results, because, for instance, the animals die from non-cancer effects of high doses. Another plausible reason is that the assessor's calculations do not adequately figure in the heterogeneity of susceptibility, so that sensitive or resistant populations are not properly accounted for. Other plausible reasons noted by Bailar et al include 1) dose-dependent intercurrent mortality. 2) direct interference of experimental methods with responsiveness, 3) saturation of enzyme systems, and 4) carcinogens with high-dose cancer-suppressing action.

The Bailar study, like EPA's guidelines for risk assessment, assumes highly competent assessors with high moral purpose but, unfortunately, in the real world we often have to deal with incompetence and greed and other less-than-perfect conditions. Besides the errors even honest assessments are prone to, the public is confronted with deliberate falsification of data by companies like Industrial Bio-Test and with deliberate withholding of information like Monsanto's failure to release its nitro-dioxin studies (Van Strum and Merrell 1990).

In addition, the public has to put up with deliberate obfuscation of assessment calculations, which companies get away with because governments typically do not have time, funds or expertise to check industry submittals closely. (In fact, EPA has been caught just cutting and pasting industry documents rather than doing its own work).

We also have to contend with misleading PR and so-called "public education" that is really corporate and government propaganda deliberately intended to confuse the public by implying (or, in some instances, outright asserting) an equivalence between predicted incidence of toxic effects in the general population and the statistical chance of a particular individual being affected. That is, the propaganda may say (or strongly imply) that a given individual has only a one-in-a-million chance of getting cancer when what the figures really show is that there is a high probability that one person out of each million exposed will die. The first case seems like a

small, perhaps acceptable, perhaps even negligible risk; the second seems more like a certainty.

And then, even without the lies and cover-ups, industry is able to delay for years the regulation of toxic materials or facilities and cleanup of toxic sites simply by insisting that more studies be done to prove beyond a shadow of a doubt that  $x$  molecules of  $y$  substance under  $z$  conditions really will kill a rat.

### ***Risk Numbers vs. Public Need***

It is no wonder the public has come to recognize that "EPA and industry have turned the toxicological concept of risk into a regulatory obstacle for [preventing] implementation of pollution prevention" (Ginsburg 1990). It has been 10 years since the *Clean Water Act* called for zero discharge and a non-degradation standard, and 20 years since the Delaney Clause was adopted, banning man-made carcinogens in our food. But we are still a long way from achieving that goal. Instead, after two decades of Earth Days and law suits, we still have governments and industries dragging their feet and only begrudgingly allowing themselves to be dragged incremental step by tiny incremental step into the 21st century.

The EPA speaks with a forked tongue about these matters. On the one hand, it passes regulations and policy statements calling for non-degradation of waters, non-migration of contaminants, and pollution prevention; but on the other hand, the agency allows pollution everywhere, degradation and migration up to a point in all environmental media, "a little bit" of cancer in our food, etc.

The public is less and less willing to be nickel-and-dimed to death by the "little-bit here, little-bit-there" approach, or stonewalled unto the next several generations by the so-called "scientific" process of profit-motivated business-government partnerships. The burden of proof should not be on the taxpayer and public agencies to prove that risks exist and to what level, but on polluting industries to prove that what they do is safe and acceptable.

The "official acceptable risk" for toxics in Arizona, is  $10^{-6}$  and this one-in-a-million standard, highly touted by the Departments of Environmental Quality and Health Services as one of the strictest in the country, is nonetheless hotly debated at hearings on water quality, air emissions and hazardous waste facilities. But it is generally a waste of time for the public to get involved in debates about what level an industry will be allowed to pollute up to, or how little of a substance it takes to kill you or deform your baby.

The public usually does not need to know how little or how much of a substance is needed to cause cancer or birth defects; all it needs to know is how to avoid the substance. Asking how little of a substance it takes to poison, or how much of a substance should be permitted, is asking the wrong question. What the public does need to know is, how can emissions and discharges and exposure be reduced or eliminated. We might even go further and say that it is not even important whether or not a risk has been demonstrated at all: in a democracy, if the people don't want to take the chance, we shouldn't have to.

The degree of risk is particularly irrelevant if it is an unnecessary or avoidable risk in the first place. The public does not ask for a risk-free world, but it does ask that avoidable risk be avoided and that unnecessary risks not be taken.

The absurdity of claiming that  $10^{-6}$  is a "safe" pollution level can be seen if we translate the arcane numbers of chemical exposure and risk assessment into more understandable terms. Would it really be acceptable for someone to fire a loaded shotgun in a crowded room, even if we knew for certain that only one millionth of the people would be hit? Of course not. But that

is what we allow polluting industries and governments to do. (I am indebted to Merrell and Van Strum 1990, for this analogy and for the following one.)

Take another example. Imagine that someday we get so good at risk assessment that we can predict—not just estimate, but predict—not only how many people will get hit by cancer, but their names. What is acceptable then?

If we strip away the triple cloaks of corporate impersonality, abstract mathematical uncertainty and statistical anonymity, it becomes clear that allowing exposure based on even very low assessments of risks is not very different from premeditated murder. When we put a human face on risk assessment, it is clearly not a smiley face.

### ***The Arizona Hazardous Waste Facility as a Bad Example***

The proposed Arizona Hazardous Waste Management Facility being built by ENSCO 20 miles southwest of Phoenix provides a revealing case study of several of the things wrong with quantitative risk assessment.

First, the risk assessments submitted by the company generally ignore environmental effects and look only at human health. I'd hate to be quoted as saying that some people aren't worth a bug (though that might be successfully argued in some cases), but I think it's definitely so that some particular non-human species and biodiversity in general are more important than some people's profits. Non-human species are like the miners' canaries, they are indicator species and early warning systems, and we can't afford to keep wiping them out. It is exactly because they are more sensitive than us that we have to set our standards for pollution at levels more protective than what is needed just for direct human health protection.

Like most risk assessments, the ENSCO assessments for air emissions look only at cancer risks, but cancer isn't even the main concern when compared to things like birth defects, transgenerational mutagenicity, neurotoxicity and immune system disease. Early versions of the PCB risk assessments were even more narrow in scope, looking only at inhalation pathways.

Furthermore, the risk assessments were done backwards. ENSCO's contractor did not go to the Mobile site and assess the risks based on real-life probable kinds and amounts of waste, but instead started from the State's preordained "acceptable" risk of  $10^{-6}$  and then tried to find ways to make the calculations fit.

The "fitting" generally was done not by altering the kind or amount of waste fed into the incinerators, or by reshaping the equipment, but by juggling figures. For instance, in one of the early versions, ENSCO came up with a low risk estimate by using weak cancer potency factors rather than the stronger EPA standards.

Other juggling, prompted by EPA criticism of ENSCO's figures and methodology, involved changing the location of the point-of-compliance or estimated maximum impact (where risk would be assessed), a clearly arbitrary decision, given the uncertainty of wind patterns in Arizona's desert valleys. At one point in the process, the assessments were completely refigured to comply with EPA's guidelines, which call for incinerators to have 125' tall stacks rather than the 40' stacks ENSCO had originally figured on. (Everybody knows that dilution—or atmospheric dispersion—is not the answer to pollution, but it is OK according to EPA. More of the forked tongue at work.)

The various revisions are fraught with mistaken assumptions and questionable methods. In



figuring the risk of exposure from accidents, for instance, the "inhalation risks estimates. . .incorporate[d] probability factors of occurrence into the calculations [thereby lowering] the overall risks substantially compared to those risks that would be expected, were a significant accident involving a PCB fire to actually occur" (Seidel 1990c).

The ENSCO risk assessment also states that an "accident's likelihood of occurrence is the sum of its expected annual occurrence over the period of years being evaluated," whereas "the true value for an accident's likelihood of occurrence," as Dr. Pike pointed out, "is one minus the probability of an accident *never* occurring over the period of years being evaluated" (GHWTAC 1990).

The ENSCO assessments also seriously underestimate the risks from transportation by considering only the small number of roads in the immediate vicinity of the proposed facility, and ignoring the risks posed by significant increases in hazardous waste traffic the facility would cause on roads and through communities all over the state (GHWTAC 1990).

But probably the biggest question about the risks associated with the proposed State hazwaste facility is one never raised in the risk assessments, and that is, is there a need to take the risks at all? Do we really *need* this facility?

The state of Arizona generates only about 30,000 tpy of hazardous waste sent off-site for treatment or disposal. About one third of that is produced by just four companies. Another third is produced by another eleven companies, and another 20% is generated by just 20 more companies. That is, approximately 85% of the waste shipped off-site is produced by only 35 companies.

There is no scientifically accepted definition of which waste is incinerable, but of the 30,000 tpy of waste generated in the state, only about 1700 tpy is, in fact, treated by incineration. How much of that is waste that can legally be treated only by incineration is not known, nor is it known how much the amount could be reduced by source reduction and waste minimization measures if they were required (GHWTAC 1990).

But again, those questions are fairly irrelevant. Or, as Dr. Connett says, "if incineration is the answer, it must have been a bloody stupid question." The obvious pertinent questions are, why are we building three incinerators with a total capacity of approximately 50,000 tpy, 97% of which will be imported from out of state, when we generate less than 5% of that amount? Do we really need these incinerators, or *any* incinerator, to deal with our waste? Do we really need to import thousands of tons a year from California? Do we really need to generate as much waste as we do? And finally, why aren't the 35 companies that produce the waste taking care of it themselves?

To return to my original premises, no additional risks are acceptable if they are unnecessary and avoidable. The proposed state hazardous waste facility is unacceptable on both counts.

### ***Qualitative Risk Assessment***

We have been looking at questions of the necessity of risk. I'd like to focus now on risk avoidance by looking first at some general aspects of *qualitative* rather *quantitative* risk assessment, and then looking at some specific elements of a pollution prevention program for the State of Arizona, incorporating the qualitative principles. Although I'll be talking about a program I'd like to see in Arizona, I think you will find that much of what I say is applicable to your own states.

Rather than quantitative risk assessment, the public is calling for a planning model that considers qualitative concerns. The basic components of qualitative risk assessment include the following six points (based on O'Brien 1990):

1. Explicit consideration of worst-case environmental and social implications of inadequate information, missing information, anecdotal information, epidemiological information and cumulative effects.

2. Labeling of consumer products to disclose all toxic ingredients and residues, their environmental fate (e.g., groundwater leaching), and their health effects (i.e., do they cause cancer). Labeling should also include some indication of the environmental costs of production and disposal of the products; Sweden, for instance, requires paper products to be labeled to disclose the amount of chlorine residues in the paper as well as amount of chlorine used and released in manufacture. This kind of disclosure is an essential part of the public's right to know, and submits products to individual choice in the marketplace. Disclosure should be for environmental as well as human health effects.

3. Elimination of particular chemicals or processes. For example, there should be an outright ban on residues of carcinogenic pesticides in food. It is simply not acceptable for the EPA, just because they have never enforced the Delaney Clause against residues of carcinogenic pesticides, to now propose that if those residues pose a  $10^{-6}$  or lower risk, that the risk is "negligible" and, therefore, the residues are "acceptable", or "below regulatory concern," and don't have to be banned.

The whole concept of "negligible risk" is appalling, especially when proposed by an agency that is supposed to be an advocate for environmental protection. There is no such thing as a negligible amount of a carcinogen. Instead of dumping the Delaney Clause, the agency should begin enforcing it, and extend it to include residues of pesticides known to cause other chronic diseases besides cancer.

We should also follow Sweden's example by banning use of chlorine in paper manufacture, and we should immediately ban production of CFCs. Similarly, we should consider a ban on incineration of hazardous waste, just as we have already established a partial ban on landfilling.

4. Prior informed consent for exposure to toxins in order to avoid "chemical trespass" and "chemical assault and battery." None of us should be exposed to toxic chemicals without our knowledge or against our will. There is a very important distinction to be made between a risk taken by choice and a risk imposed against our will, especially if it is imposed for someone's else's profit. Exposure without consent is an invasion of our most intimate privacy, our bodies and our minds, and in legal terms it constitutes what we call *chemical trespass* or *chemical assault and battery*.

Prior informed consent is related to the right to know and part of a growing movement to protect our right to *say no*. This struggle is primarily being carried out at the local and state levels where toxic torts represent a growing case load in local and superior courts. Around the country, more and more ordinances and laws are being passed requiring lawn care companies, farmers and apartment and motel owners to post their properties so the public knows what toxic pesticides are being sprayed where and when, and what the potential effects are.

5. Disclosure of assumptions and information *not* included in risk assessments. For instance, 1) tests not included in setting standards or emissions limits; 2) whether or not degradates of

substances were considered; 3) how sensitive populations were or were not factored in; 4) how other states/countries deal with the issues; etc.

For instance, the "Administrative Record" for the ENSCO permits as defined by ADEQ does not include significant documents needed by the public to understand the issues and technical matters relating to the permits. For example, not included are a series of memos from the EPA regional toxicologist pointing out, among other things, that as of May first of this year, assessed risks for the incinerators were still beyond state and federal standards (while ENSCO and ADEQ officials at the same time were proclaiming that all emissions from the facility would be below the State's  $10^{-6}$  standard). The same memos revealed that ENSCO was using lower-than-standard potency factors in its risk assessments. Similarly, EPA and ADEQ Notices of Deficiencies of the evolving proposals and ENSCO responses are extremely important to public understanding of and participation in the process, but have been excluded from the Administrative Record.

6. Explicit priority for use of preventative and least-toxic alternatives. That is, a pollution prevention law.

### ***Elements of a Comprehensive Pollution Prevention Program***

What is needed is a comprehensive program that does not just address problems at the end-of-the-pipe, but is a truly cradle-to-grave program that seeks to prevent disease and other problems by regulating hazardous waste in the context of hazardous materials in general.

Hopefully, some of the elements of such a program will be passed by the Arizona Legislature in the upcoming session. If that doesn't happen, we can probably expect a citizen's initiative in 1992 patterned after California's Big Green.

#### *1) Policy changes*

Pollution prevention should become the State's policy, with a corollary that unnecessary, avoidable risks to public, occupational and environmental health are not acceptable.

Furthermore, "if we are ever to find workable long-term solutions to our environmental problems, we need a completely new conception of the relationship between economics and ecology, one that regards the economic subsystem as part of the larger ecological support system" (Costanza and Wainger 1990).

Rather than falling over ourselves to invite polluting industries into Arizona (as we do now), the State should make a serious commitment to sustainable economic development. Hazardous waste should not be considered a desirable growth industry and the State should not be in the hazardous waste business.

By sustainability, we mean "the amount of consumption that can be sustained indefinitely without degrading capital stocks," which means in this case, the environment (Daly and Cobb 1990). "'Sustainability' does not necessarily mean a stagnant economy, but we must be careful to distinguish between growth and development'. Economic growth, which is an increase in quantity, cannot be sustainable indefinitely on a finite planet. Economic development, which is an increase in the quality of life without necessarily causing an increase in quantity of resources consumed, may be sustainable. Sustainable growth is an impossibility. Sustainable development must become our primary long-term goal" (Costanza and Wainger 1990).

No facility should be permitted unless it proves to the state and local community that its opera-

tion will result in a net environmental gain, or, if it can't do that, prove that the increased risk and environmental loading are necessary and unavoidable. In figuring such costs, the facility should have to figure in so-called externalities like costs to the environment and medical costs to the community that are usually not factored in to risk-benefit analyses.

2) *Goals*

- Elimination of genetic toxins in food and water
- 50% reduction in toxics use by industry by 1995
- 50% reduction in hazardous waste generation by 1995
- 50% reduction in generation of incinerable hazardous waste by 1993. (The California Department of Health Services and major industries in the state announced a couple of weeks ago that they were going to reach this goal)

3) *Mandatory Environmental Impact Studies* including full public participation and consideration of alternatives, for all projects using state resources. One of the major concerns of the public about the state hazardous waste facility is that no alternatives have been considered.

4) *State funding for local emergency planning and response.* The capability for emergency response to hazardous materials incidents, including emergency medical response, is very limited throughout most of the state. Only Maricopa and Pima Counties have trained and equipped hazmat response teams. Furthermore, although almost all states now have emergency planning laws and local emergency planning committees (LEPCs) pursuant to federal requirements under Title III of SARA, the committees in general exist only on paper because, as with other programs mandated from the top down, they have no funding. LEPCs generally are all volunteer have no funds for staff or file cabinets or postage. We need to get serious about emergency planning and make these LEPCs the heart of local pollution prevention programs.

I am a member of the LEPC in my county, and we have just undertaken an innovative approach to the hazmat problem there. After public oppsitiion caused a chemical company to withdraw its application after the county supervisors had approved it, the county Planning and Zoning came to our LEPC and asked us to screen future applications for potential environmental problems before P&Z makes its decisions. As the only body in the county representing the public and having experience in hazardous materials risk analysis, we were glad to take on the added chore, even though it does not directly relate to the emergency planning fuction LEPCs were created for.

By now some of you have probably put your technical caps back on, but for a moment I'd like you to think of yourselves as public citizens again and to consider getting involved with your LEPCs. They need the assistance of health professionals very badly, and with your help they can go a long way toward reducing the hazards of toxic chemicals in our communities.

5) *Public Participation* the state should provide funding for public participation in the permitting process for toxic substances facilities, and for the public to hire experts to represent them in technical proceedings.

6) *Local Authority* local communities must be given more power to protect themselves. The state and federal governments are not doing it. The right to say no is most applicable at the local community level where polluting industries have their primary impact. Communities should

have the first right of denial. We would not be talking about the proposed ENSCO incinerator in Mobile if the people there had been given the right to say no ten years ago when the facility was first proposed.

Community empowerment is especially important in light of the fact that our worst polluting facilities always seem to be sited in underprivileged neighborhoods. We don't put our chemical plants in Scottsdale and Grosse Pointe. Indian reservations, for instance, have become prime targets for waste-importing schemes throughout the west. Mobile, Arizona is typical in this regard: it is a low-income black rural community. It is not easy to find poor black neighborhoods in rural Arizona, but our Legislature managed to find one.

The State should not consider any permits for a facility until the local community has done a preliminary environmental review (with minimum standards for public participation and technical matters set by the State) and signed off on the proposed project.

7) *New subdivisions* along with proving 100-year adequacy of water supply, new subdivisions should be required to:

- disclose all hazards to residents posed by toxic substances facilities or activities in the neighborhood (toxic waste dumps next door, for instance, or hazwaste incinerators upwind, or chemical plants next door)
- provide trip reduction plans (mass travel, ride-sharing, etc.) to minimize pollution from vehicles going to and from the development
- install solar power on at least 50% of the units in the subdivision

8) *Air Quality*

- Mandatory monitoring, reporting and incremental decreases in toxic emissions by major polluters
- Repeal of the part of State law that prohibits the State from having stricter standards than the EPA

9) *Water Quality*

- Adoption and strict enforcement of non-degradation and zero discharge standards for surface waters so industries have to clean up their wastestreams before discharging them into the sewer system, so municipal wastewater treatment plants in turn can stop polluting our rivers and streams
- Speeded-up clean-up of toxic sites, including the eighty miles of the Gila River that is so polluted downstream from the Phoenix wastewater treatment plants that the Fish and Wildlife Service has declared the fish unfir to eat.

10) *A Pollution Prevention Institute* on the model of the Lowell University institute in Massachusetts established at one of the State universities to promote pollution prevention by providing training and technical assistance to industrial and governmental polluters.

11) *An Office of Pollution Prevention and Public Advocacy* established within the Department of Environmental Quality with an office in every county seat to provide the public

with better access to departmental proceedings and to assist the public, business, and other political jurisdictions on matters of pollution prevention.

12) *Phase Out of Fossil Fuels and Nuclear Power*

***Risk Assessment vs. Emergency Response***

In closing, I'd like to suggest that, given the catastrophic condition of the world environment, there is a much better model available for environmental policy and action than quantitative risk assessment, and that is the emergency response model. In an emergency situation, it is fairly irrelevant how many parts per million of the chemical are toxic. The emergency responder's job is to reduce exposure, pronto. First get the victim away from the toxin, decontaminate him or her, administer emergency treatment as needed, and plug the leak: stop it at its source. Next, mop up the immediate mess. Then we can worry about trying to calculate the levels we have to clean up the scene to.

The analogy to global conditions is apt. We are in an emergency situation. Holes in the ozone layer, global warming, deforestation, desertification, air unfit to breathe, food unfit to eat, water undrinkable and toxic waste dumps all over the place. We should be in an emergency response mode. Our first job should be to stop the exposure, reduce the hazard, then plug the leak. But instead, we keep increasing the exposure, increasing the size of the release, and we do it by basing our environmental policy and regulation on risk assessment.

## **Plugging the Leak: Emergency Response to Global Crisis (1991)**

Michael Gregory, for the Sierra Club, *Environmental Carcinogenesis Reviews (J. Envir. Sci. Health)* vol. C8 (1992) (2): 229-243.

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It has been more than 30 years since the Food, Drug and Cosmetic Act was amended to ban artificial carcinogens in our food, more than 25 years since Rachel Carson's Silent Spring alerted us to the dangers of persistent pesticides, and 12 years since Congress declared non-degradation of our waterways and zero discharge of contaminants the law of the land.

Similarly, it has been almost 20 years since the Stockholm Conference on the Human Environment declared that "States have. . .the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction" (1). In the past ten years, reaffirmations of that principle have become almost commonplace (2), and there are now over 125 international conventions, treaties, resolutions and declarations dealing expressly with environmental protection (3).

Yet today we find more not less smog in our cities, more pesticides in surface and groundwater, an ever greater hole in the ozone layer, more greenhouse gases in the atmosphere, more junk in the oceans, more toxic wastes in our Third World neighborhoods at home and abroad, and fewer species every minute. What went wrong?

In the United States, the problem has been, in part, a weak Congress confronted with the anti-environment policies of the Reagan Administration and the consequent failures of the EPA to act as an aggressive advocate for the environment. The federal pesticide law, for instance, has remained an environmental embarrassment for over ten years with no reform in sight; and the EPA, despite promising signs of rejuvenation, remains wedded to moribund policies of "assimilative capacity" and "negligible risk."

Internationally, part of the problem has been the nearly insurmountable barriers of international red tape, complicated by the crushing poverty of many less-developed nations and the aggressive expansion of polluting corporations. Even when conventions are passed and finally ratified, they generally suffer from lack of practical implementation mechanisms.

But even more fundamentally, the problem is our collective failure to address causes rather than symptoms. Faced with "the cultural and ethical degeneracy of unmitigated free-enterprise capitalism" (4) that began with the Industrial Revolution 200 years ago, we continue to approach the problem through theories of political economy that were developed primarily to "rationalize exploitation of man and nature by the market economy" (5).

"The environmental crisis is a crisis of institutional and corporate production" (6), but rather than address the front end of the pollution cycle, we have continued to look for end-of-the-pipe remedies. Rather than preventing pollution, we have focused on trying to figure out how much we can get away with. We have been far more interested in protecting production than human, occupational and environmental health.

The problem is global, but the primary source of the problem is the industrialized nations which generate almost all of the world's toxic waste and whose addiction to fossil fuels produces almost all the greenhouse and ozone-depleting gases in our atmosphere (7). U.S. industries report five million tons of toxics released into the environment annually, and some 1.2 million tonnes of toxic wastes are exported annually from OECD countries (8).

It may be that "the reversal of the current destruction of our global commons will require a restructuring of our traditional notions of sovereignty, national security, and international law" (9), but until comprehensive, multilateral, enforceable, and enforced environmental protection and resource conservation treaties exist, nations will have to act unilaterally (10). The developed nations have not only that opportunity, but the obligation: since they produce "the largest part of the current emission of pollutants into the environment, including toxic and hazardous wastes. . . those countries have the main responsibility for combating such pollution" (11). Clearly, if we solve the problem in the U.S., we will have gone a long way toward solving the global problem.

### ***Exporting the Hazard***

Whether we are talking about catastrophic disasters like Bhopal, Seveso, Rhone-Poulenc and Chernobyl (12) and repercussive "circle of poison" effects (13), or less-publicized disasters like the daily poisoning of Third World farmworkers and their families (14) and the general poisoning of less-developed nations with industrial chemicals (15), it is imperative that the developed nations immediately ban the export of products that are banned or severely restricted here, and insist that when hazardous products are exported, technology must be transferred along with the hazard to assure that the host country is able to handle it properly (16).

In general, "transboundary movement of hazardous wastes should be banned," especially shipments to developing nations, though regional agreements among developed nations might be permitted to allow for disposal in those countries with more favorable geographic features (17). Transnational companies generating hazardous waste in a less-developed country should be required to return their wastes to their mother country for proper disposal (18). We must stop thinking of traffic in hazardous waste as a growth industry.

The "harmonization" concept being touted by the U.S. in pursuit of the General Agreement on Tariffs and Trade (GATT) would require trading members to conform to a lowest common denominator of environmental and human health protection (19). To the contrary, all members of any trade agreement should conform to the highest possible standards; certainly no country should be penalized for having high standards. Just as local communities must be free to set higher standards than states, and states to exceed federal standards, so the rights of trading members to have higher standards or stricter regulations should not be pre-empted by the general body.

### ***Environmental Rights vs. Risk Assessment***

Environmental protection has become part of the worldwide democratization movement, and cannot be separated from protection of human rights, the most basic of which is "the right to live" (20). "If a person is denied the basic necessities of life, there are no other civil rights or



civil liberties" (21).

The World Commission Experts Group Report (22) sets forth several other generally recognized principles of environmental justice, including 1) that every human being has a fundamental right to a healthy environment; 2) that states shall conserve the environment for the benefit of present and future generations; 3) that states shall maintain ecosystems and ecological processes essential for the functioning of the biosphere; 4) that states shall use transboundary and global natural resources in a reasonable equitable manner; 5) that states shall prevent or abate any transboundary pollution which causes or could cause significant harm; 6) that states shall provide prior notification and assessment of planned activities which may have significant transboundary effect.

Individuals, communities and humankind as a whole share these rights (23), to which we should add at least the following three: 1) the right not to be poisoned; 2) the right to know if we are being poisoned, and if so, by what, by whom, and for whose benefit; 3) the right not only to know, but to *say* No to the poisoning.

In looking at the problem from a global perspective, we may tend to forget that it is real individuals and real communities we need to protect, not statistical nonentities. "Look," the risk assessor says, "only one in a million will die." But in a democracy, that one is precisely our concern. To ignore the individual is to fall into the utilitarian trap of corporate collectivism. While we must continue to think globally, we need to remember that "the really *real* environment is that which immediately surrounds the individual, and for many millions that has long been physically and psychologically maiming. . . . the vast majority of urban and rural workers have never known anything but a polluted environment" (24). We cannot attain a non-polluted global system without assuring that individuals have non-polluted communities and workplaces. That is the challenge of environmental protection as it is for democracy.

Asking how much of a substance it takes to kill you or how little it takes to deform your baby, or what level an industry should be allowed to pollute up to, is asking the wrong question. The right question is, how can the emissions and discharges and exposure be eliminated or reduced, and if they aren't, then which of us is to be considered expendable. The degree of risk is particularly irrelevant if the risk is unnecessary or avoidable in the first place. We cannot expect a risk-free world, but we can and should demand that avoidable risks be avoided and unnecessary risks not be taken.

Rather than finding out how to eliminate toxic risks and thereby satisfy the public's criteria for acceptability, industry and government are putting huge resources into managing risk (25) and, what's worse, trying even harder to manage risk *perception* with the hope of lowering the public's acceptability standards. Risk assessment and risk management devolve all too easily into a marketing strategy for modifying consumer behavior.

As typically practiced in the real world, the computer game of quantitative risk assessment "is a pseudo-scientific rationalization for a political decision already made" (26). There is little ethical difference between someone firing a shotgun into a crowd knowing with "scientific certainty" that only one millionth of the people will be hit, and allowing industries and governments to pollute up to a  $10^{-6}$  risk level. When we strip away the triple cloaks of corporate impersonality, abstract mathematical uncertainty and statistical anonymity, allowing exposure based assessments of even very low risks looks a lot like premeditated murder (27).

On the discredited assumption that the environment can absorb and harmlessly dissipate vast quantities of pollution and environmental destruction, we continue to fill the world with our

waste products, degrading the environment and the lives of millions of people. It is time to give up on the assimilative capacity theory. We must replace risk assessment, emissions limits and exceedance levels with "precautionary actions" (28) and set "biological quality goals" that will keep pollution well below the levels of environmental loading that already exist (29). In the words of EPA Administrator William Reilly, "above all we need to mobilize a national effort to *prevent* pollution before it's created" (30).

### ***Net Environmental Gain***

The surest way to end pollution is to prevent it at its source, a process that has been clearly outlined by organizations like the Toxics Use Reduction Institute at Lowell University (31), mandated by several states and endorsed, but not implemented, by the EPA (32).

Given the magnitude of the global problem, it is no longer even adequate merely to prevent further deterioration; instead we must take immediate steps to "restore the global ecological balance" (33). "At this moment of human endeavor" industries and governments must begin to "actually improve the currently degraded" environment (34).

"A fundamental assumption of pollution prevention requires that emissions or discharges be reduced or eliminated whether or not an existing health risk can be demonstrated. In other words, a reasonably avoidable exposure to a toxic substance should be avoided" (35). We can no longer afford the luxury of waiting until "all the evidence is in"; all the evidence is never in, and we are in a state of emergency. Not only must we end the hopeless "strategy of attempting to regulate and control each separate chemical, with the premise that each toxin is innocent until proven guilty" (36), but we must focus on "eliminating and preventing pollution. . .even where there is inadequate or inconclusive scientific evidence to prove a causal link between emissions and effects" (37).

It is, in fact, exactly because "neither the extent of damage nor the linear, causal and time relationships can be recognized in advance—not even if all the scientific possibilities are exhausted," that we should prohibit production and use of any products 1) that are potentially or actually too toxic or too persistent to guarantee their non-release to the environment; or 2) that cannot be recycled (38). It is time to stop using the environment as a laboratory and its inhabitants as guinea pigs.

Perhaps the most obvious candidates are halogenated compounds. Beginning with CFCs and the use of chlorine in paper manufacture, we should move quickly to eliminate halogenated pesticides, bleaches, sterilants and other non-essential uses of these uncontrollable substances.

We should also ban carcinogenic, teratogenic and mutagenic pesticides. It is simply not acceptable for the EPA, just because they have never enforced the Delaney Clause against residues of carcinogenic pesticides in food, to now propose that those residues pose a "negligible" risk and, therefore, are "acceptable" or "below regulatory concern" (39). The negligible risk policies of the Reagan and Bush Administrations (40) are clear examples of how the "EPA and industry have turned the toxicological concept of risk into a regulatory obstacle for [preventing] implementation of pollution prevention" (41). There is no such thing as a negligible amount of a carcinogen. Instead of dumping the Delaney Clause, the agency should begin enforcing it, and extend it to include residues of pesticides known to cause other chronic diseases besides cancer.

Before a project or product is permitted, it should have to meet three tests: 1) is it needed, i.e., are its risks *necessary* to the community or communities that will have to bear those risks; 2) are

the risks avoidable, i.e., are alternatives available that are less detrimental to human health and the environment; and 3) will the project or product result in a net environmental improvement. If it cannot meet these criteria, the burden of proof should be on the producer to prove that the increased risk and environmental loading the project will cause are both necessary to global survival and unavoidable.

An integral part of any pollution prevention program is the setting of finite, achievable goals (42). These should include 1) elimination of genetic toxins in food and water; 2) 50% reduction in toxics use by industry by 1995; 3) 50% reduction in hazardous waste generation by 1995 (43); 4) 50% reduction in generation of incinerable hazardous waste by 1995 (44); 5) 50% cut in production of greenhouse gases and 90+ % cut in ozone-depleting chemicals by the year 2010; 6) installation of solar heating and photovoltaics on at least 50% of all federal buildings by 1995 and on all new subdivisions, malls and industrial parks; and 7) closure of nuclear weapons plants and destruction of nuclear stockpiles by 2020.

Other reduction measures to be taken include: 1) expanding the narrow federal and Basel Convention definitions of hazardous waste to include whatever is designated as hazardous waste in any state or territory; 2) taxing industrial releases of toxic and persistent substances and generation of wastes; 3) establishing local, national and international pollution prevention institutes on the Lowell University model, funded by polluting industries, to promote pollution prevention by providing training and technical assistance to industrial and governmental polluters and to developing nations.

### ***Sustainable Development: Needs vs. Demands***

Since pollution is to a great extent the result of a quest for short-term profits (i.e., shorter than the duration of impacts), "if we are ever to find workable long-term solutions to our environmental problems, we need a completely new conception of the relationship between economics and ecology, one that regards the economic subsystem as part of the larger ecological support system" (45).

The international connection between environmental sustainability and development goes back at least to the 1972 Stockholm Declaration (46) and the 1974 Charter of Economic Rights and Duties of States (47), but not until the 1980s was economic development generally related "to the long-term perspective, to quality of life, to the importance of cultural continuity, and to health and safety issues" (48).

The change of perspective is apparent, for instance, in the difference between the 1980 Brandt Report's declaration that "the care of the natural environment is an essential aspect of development" (49) and the concept of "sustainable and equitable development" as expressed in the 1989 Convention Concerning Indigenous and Tribal Peoples in Independent Countries (50).

Similarly, the 1987 Brundtland Report, *Our Common Future*, discusses sustainable development in terms of "needs", in particular the essential needs of the world's poor, to which overriding priority should be given" and "limitations imposed by the state of technology and social organization on the environment's ability to meet present and future needs" (51). Sustainable development is "development that meets the needs of the present without compromising the ability of the future generations to meet their own needs" (52); put in more traditional economic terms, "the amount of consumption that can be sustained indefinitely without degrading capital stocks," i.e., environmental resources (53).

The term *needs* must be carefully defined. It is a myth that corporations exist only to "serve the

needs of the masses;" they create those needs to suit their own consumerist ends. It is not needs, but economic *demands* the corporations seek to satisfy, and the demands are those of the corporate system, not humankind (54). The "demand" for built-in obsolescence, for instance, is clearly not a "need", and is contrary to the goal of sustainability. We must drop the obsolescence ethic and return to the pre-consumerist ethic of product longevity.

Similarly, the rituals of advertising and marketing are outmoded in terms of current environmental conditions; advertising that promotes consumerism is an anachronistic liturgy that can only lead to continued environmental degradation. As we have required cigarettes to be labeled and ads cut off TV, so we should do for all persistent and toxic chemical products that have not been banned.

Despite periodic attempts to modify our vision, high energy societies like ours continue to see the world as commodities or resources (55). But "labor, land and money are obviously not commodities; the postulate that anything that is bought and sold must have been produced for sale is emphatically untrue" (56), and to continue to see them that way is to rob people of their humanity and the natural world of its integrity, to destroy the ecological balance upon which depend human and non-human species alike.

Market "expansion rather than redistribution has been the primary means for avoiding resolution of the antithesis between individual profit and social equality" (57), but if we are ever to achieve the goals of sustainable development we must stop equating *success* with increased production and sales, but define it instead in terms of environmental enhancement, including long-term stability of the personal and community environments.

"'Sustainability' does not necessarily mean a stagnant economy, but we must be careful to distinguish between 'growth' and 'development'. Economic growth, which is an increase in quantity, cannot be sustainable indefinitely on a finite planet. Economic development, which is an increase in the quality of life without necessarily causing an increase in quantity of resources consumed, may be sustainable. Sustainable growth is an impossibility. Sustainable development must become our primary long-term goal" (58).

The task of the 1990s will be to assure not only that "the goals of economic and social development [are] defined in terms of sustainability in all countries" (59), but that environmental and economic justice is recognized as an integral component of sustainable development.

### ***Corporate Responsibility and Economic Justice***

Whether we call it corporate responsibility, environmental justice or just good business, industries using hazardous materials should be required to meet the highest standards of public, occupational and environmental health protection and to disclose their potential impacts to the public before they are allowed to operate. Every industry should be required to meet at least the basic standards of the Valdez Principles (60).

The requirements of NEPA, TSCA, RCRA, CAA, CWA, OSHA, and other U.S. environmental and occupational health and safety laws should not end at our borders. U.S. government and U.S.-based companies operating in foreign countries should have to meet the same standards required at home, as well as complying with all laws and regulations of the host nation (61).

"Environmental impact assessment should be undertaken whenever investments or other development activities may have adverse environmental consequences whether within the national territory concerned, for the environment of neighbouring countries or for the global

commons (62). Toxic use and clean production analyses/audits must be conducted in all industrial sectors to identify ways of eliminating persistent and toxic substances and processes and of achieving maximum waste minimization prior to off-site shipment for incineration or disposal. Use of less-toxic or lower impact available alternatives should be mandatory. The test should be, can a product be produced, consumed and used as well as repaired or reprocessed in such a way that the material can be fully recycled? (63).

In analyzing the cost/benefit ratios of proposed actions, the company should have to figure in so-called externalities like medical and environmental and other social costs to the community. The main consideration must be the survival needs of the planet, not just private profit.

Whether it is a "bank for sustainable development" funded from military and defense budgets (64) or a trust fund paid for by polluters (65), or a toxics use reduction institute funded by transnational corporations, or some other means, polluting industries have the responsibility to provide financial assurances so the public and less-developed nations can develop and implement clean technology and participate fully in hazardous materials actions that affect their lives.

Pollution prevention and net environmental improvement must be part of the requirements for international financing. The World Bank loans now require developing countries to institute massive changes ("restructuring") in regard to development of natural resources, but this exploitation occurs without equivalent environmental safeguards so that the natural resource more often than not is depleted to satisfy the demands of the international financial community without adequate environmental safeguards.

Locally, industries should be required to set up trust accounts to fund infrastructure improvements so communities can cope with the impacts caused during the development, operations, closure and post-closure phases of the facilities.

### ***Right-to-Know***

Informing the exposed and potentially exposed population is an essential ingredient of hazard reduction. Risk assessments, hazard analyses, environmental impact studies, etc. must consider qualitative data as well as quantitative, including explicit consideration of worst-case environmental and social implications of inadequate information; missing information; anecdotal information; epidemiological information; cumulative effects; and disclosure of assumptions and information not normally included in qualitative risk assessments, including 1) tests not included in setting standards or emissions limits; 2) whether or not degradates of substances were considered; 3) how sensitive populations were or were not factored in; 4) dissenting interpretations by other agencies; 5) how other states/countries deal with the issues (66).

Consumer products should be labeled to disclose *all* toxic ingredients, degradation products and residues, their environmental fate (e.g., groundwater leaching), and their potential health effects. Labeling should also include some indication of the environmental costs of production and disposal of the products. Environmental labeling is an essential part of the public's right to know, and submits products to individual choice in the marketplace.

Prior informed consent is perhaps the primary principle of right-to-know. To expose us to toxic chemicals without our knowledge or against our will is to commit "chemical trespass" and "chemical assault and battery." There is a very important distinction to be made between a risk taken by choice and a risk imposed against our will, especially if it is imposed for someone else's profit. Prior informed consent should be required not only before exposing individuals and

communities in this country, but from individuals and communities likely to be exposed in countries importing our hazardous products and processes (67).

### ***Community Empowerment***

Polluting industries have their greatest impact locally, in the community and workplace, so those local sectors must be given more power to protect themselves. Communities should have the first right of denial on the siting of a hazardous materials industry. State and federal agencies should not consider any permits for a facility until the local community has done a preliminary environmental review (with minimum standards for public participation and technical matters) and signed off on (i.e., consented to) the proposed project.

Community empowerment is especially important since our worst polluting facilities always seem to be sited in under-privileged neighborhoods. Native American lands throughout the United States, for instance, have become prime targets for waste-importing schemes just as less-developed nations have throughout the world.

In trying to give more authority to communities, we must not allow local control to be usurped by local oligopolies of the wealthy few who, because they do not bear the total costs of production for exploitation of the commons, almost invariably advocate increasing productivity without commensurate concern for social and environmental equity (68).

Nongovernmental organizations are an effective means of assuring local citizen participation in sustainable development processes. As recommended by the Brundtland Commission, governments should "recognize and extend NGOs' right to know and [to] have access to information on the environment and natural resources; their right to be consulted and to participate in decision-making on activities likely to have a significant effect on the environment; and their right to legal remedies and redress when health or the environment has been or may be seriously affected" (69).

Polluting industries should also be required to provide funding through governments for public participation in the permitting process for toxic substances facilities and for the public to hire experts to represent them in technical proceedings.

### ***Emergency Response to Global Crisis***

Given the catastrophic world conditions, "we need to put an end to the arms race and convert it into a race for stabilizing the natural environment. The new problem is to translate the environmental problem from the scientific question into a political question and the central political strategy of our time" (70).

There is a much better model available than the little-bit-here, little-bit-there assimilative capacity model. It is the emergency response model. In an emergency situation involving hazardous materials, it is fairly irrelevant how many parts per million of the chemical are toxic. The emergency responder's job is to rescue victims and his or her first task is to reduce the exposure. Get the victim out of the cloud or spill, if possible; administer emergency treatment as needed; then plug the leak: stop it at the source. Next, mop up the existing mess.

The analogy to global conditions is apt. We are in the midst of a global emergency. We should be in emergency response mode. Since we can't move the victims off the planet or sweep the poisons under the rug, our first order of business is to stop the exposure, reduce the hazard, plug the leak.

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## **On the Proposed Rule on Risk Management Programs for Chemical Accidental Release Prevention (1994)**

Michael Gregory, submitted to the US-Environmental Protection Agency, Air Docket (LE-131)Attention: Docket No. A-91-73 (18 January 1994)

The following are the comments of Arizona Toxics Information, Inc. on the EPA's proposed rule on risk management programs for chemical accidental release prevention as required under section 112(r) of the Clean Air Act as amended.

### §68.3 Definitions

*Offsite.* The definition is inadequate in several ways. For example, it references only two-dimensional, horizontal boundaries excluding the vertical dimension both above and below the point of release, thereby excluding from consideration both groundwater and such potential overhead problems as stratospheric destruction or exposure of birds and other organisms in flight. Part of the inadequacy is due to the improper narrowing of consideration to humans, a limitation made explicit in the concern within the property boundary to "areas. . .to which the public has routine and unrestricted access." The Act (as acknowledged in other parts of the Rule, e.g., the definition of "*significant accidental release*" immediately following) requires protection of the environment (including wildlife) as well as humans.

Regarding the number of scenarios required to be reported in the RMP by a facility, all scenarios that are shown by modeling to produce a cloud with specified concentrations beyond the site boundary should be reported and analyzed. Off-site analysis, furthermore, should not be separated from the five-year accident history.

*Worst case release* is defined tautologically by referring to "worst offsite consequences," which is left undefined. Some of the clarifying guidance language from §68.15(c) should be incorporated here.

### §68.12. Registration.

(a) Three years is too long. Registration should begin within one year for most facilities, with options for taking longer in cases where facilities demonstrate need.

### §68.15. Hazard assessment.

(a) "evaluate the POTENTIAL impact"

(b)(2), (b)(3), and (e) and *passim*. The phrase "other more likely significant" is ambiguous; it can be read as referential, meaning "more likely than worst-case;" or as "more likely among other significant scenarios in general." The first reading implies, improperly, that in all cases a worst-case scenario is not the most likely when, in fact, at some facilities or some points in some processes, the most likely accident scenario will be the worst case. The ambiguity could be cleared up by deleting the words "other more"; in addition, the word "likely" should be defined or some guidance given (as is given for worst-case in (e), below) as to what the cut-off point should be.

(e) Change "or" to "and"

(e)(2) Delete "or damage"; "exposure" is sufficient, as in (3), immediately following. In any case, "damage" is undefined; "adverse effects" would be a better term, both more protective and more easily enforced.

(e)(4). Change "Environmental damage" to "Adverse environmental effects" and include in the list of environmental features "bodies of water, drinking water systems, crops," and other such critical elements as are normally considered in vulnerability analyses.

(h)(3)(iv). The phrase "acute toxicity concentration" is unclear and not defined; it should be clarified that what is meant is something like "determination of the distances downwind to the points where the concentration is less than that which may cause or have the potential to cause adverse effects to humans or other organisms." Furthermore, the rule should include similar language for chronic toxicity.

(h)(3)(v). Change to "populations or areas exposed or potentially exposed" or "populations exposed or potentially exposed and adversely affected or potentially adversely affected areas."

(h)(I). Apparently this is a typo; change to (h)(vi).

#### §68.20. Prevention program purpose.

In first line, change "substance" to "substances". In third line, change "control" to "prevent". This second change is indicative of the need for a major conceptual change throughout the prevention program rules, namely a change away from a focus on "secondary prevention" to encouragement of "primary prevention." As emphasized in the first page of the abstract of the July 1993 study done by the MIT Center for Technology, Policy and Industrial Development for the agency, "primary prevention relies on the development and deployment of *inherently* safe technologies that prevent the *possibility* of an accident. Secondary prevention reduces the *probability* of an accident. Mitigation and emergency responses seek to reduce the *seriousness* of injuries resulting from accidents. Most chemical safety efforts to date have concentrated on secondary prevention and accident mitigation."

Despite the sound advice of the MIT study, throughout these draft rules the agency insists on emphasizing mitigation and emergency response, i.e., on control rather than prevention. The agency's approach, which amounts to attempts to minimize rather than prevent, is especially apparent in the process hazard analysis section of the prevention program (§68.24), which, instead of requiring identification of and otherwise encouraging implementation of "inherently safe technologies," merely continues to focus on detection, mitigation, warnings, containment and control. In short, rather than encouraging innovative prevention technology, the proposed rules merely require description of existing processes. Apparently, the only actual prevention the agency intends to achieve through this rule will be due to facilities changing substances in order to avoid having to file in the first place. Although this result is undeniably desirable, it is clearly an indirect effect (perhaps what might be called "tertiary prevention"), and not nearly as effective as what might be achieved through direct encouragement of primary prevention.

We strongly urge the agency to incorporate primary prevention strategies in all parts of the rule on prevention programming in general and, in particular, to require that facilities identify opportunities for implementing primary prevention during their process hazard analyses (§68.24), in training programs (§68.30) and when considering process changes (§68.36).

Furthermore, since preference for inherently safe technologies should be shown at all stages of operation, including research and development, we strongly urge that the agency require management to include as top priority within its policy statements the use of inherently safe technologies, and an explanation for why "best available prevention technologies" were not used as alternatives by the facility.

Specific to the request for comments, we do not feel that ammonia should be exempted as a substance from the RMP, nor should POTWs be exempted as a facility.

§68.45. Emergency response program.

The agency should encourage industries to fund emergency planning and response programs in the communities where their facilities are located, rather than only developing private response teams. Since Congress and the agency have allocated almost no funds for developing adequate LEPCs and local response capability, most communities are utterly unequipped to deal with the increased burden put on them by planning for potential chemical accidents. The facilities that present these potential impacts should be charged with covering the infrastructural improvements needed by the communities. One way to do this, and at the same time facilitate the community-industry cooperation everyone agrees is desirable, would be for the industries to put their emergency funding into development of mutual community planning and response capability. The agency could encourage this by making development of such mutual response programs a preferred option in this rule.

§68.50. Risk management plan.

Similarly, the rule should encourage facilities to develop their RMPs in full cooperation with their potentially impacted communities. Furthermore, citizen/worker participation should be an integral part not only in the development of the RMP, but also in the development of the hazard assessment and emergency response programs, and accident prevention activities should allow for a public petition process to trigger RMP audits. LEPCs and response agencies should be mandated to work with the facility personnel in development of the RMPs, rather than being mere recipients of privately developed documents.

Such cooperation should include provision for LEPCs to receive computer equipment so all RMPs can be developed, submitted, stored and accessible to the public electronically. In many cases, it would be cheaper for the facilities to provide computer capability to communities than to develop multiple copies of the RMPs in hard copy.

In any case, RMPs should be available and readable (with consistent format, preferably according to an EPA form or guidance) at public repositories in the vicinity of reporting facilities. Having them only on-site may provide "availability" but doesn't provide "accessibility".

Specifically, public accessibility should include access to:

- 1) Technical background data regarding how worst case scenarios are derived; In order for the public to be able to scrutinize the safety systems set up, it needs access to both the data and the assumptions made in developing the scenarios.
- 2) Disclosure of on-site consequences, with "near misses" investigated and the on-site consequences reported.
- 3) Full materials accounting and disclosure of chemical data, including the access to data for tracking and evaluating prevention.

EPA should also encourage the involvement of health professionals in the public disclosure process. This would include an increase in clinics or other facilities in key areas, staffed with

health professionals trained to diagnose and treat exposure-related illness.

## Prevention, Not Risk Assessment

Michael Gregory, presented to The National Coalition Against Misuse of Pesticides "Twelfth National Pesticide Forum," Arlington, Virginia (12 March 1994)

The scientific literature is full of critiques of quantitative risk assessment. Even at its best (which we seldom see), it is an imprecise tool. Bailar et al (1988), e.g., cite six fundamental problems which tend to make risk assessments, even with built-in safety factors, underestimate risk.

Bailar et al (1988) point out "six plausible reasons for expecting a one-hit formula to give nonconservative estimates of risk. One plausible reason is that intervening mechanisms may skew results, because, for instance, the animals die from non-cancer effects of high doses. Another plausible reason is that the assessor's calculations do not adequately figure in the heterogeneity of susceptibility, so that sensitive or resistant populations are not properly accounted for. Other plausible reasons noted by Bailar et al include 1) dose-dependent intercurrent mortality, 2) direct interference of experimental methods with responsiveness, 3) saturation of enzyme systems, and 4) carcinogens with high-dose cancer-suppressing action. The recent National Academy of Sciences study on *Pesticides in Children's Food* comes to similar conclusions. And that's at its best.

At its worst (which is often what we see in the field), quantitative risk assessment is a computer game that gives you any answer you want—which in real life typically means whatever you pay for.

In the hands of regulatory agencies, as a basis for setting standards and policy—whether we are talking about pesticides, or clean air, or clean water, or hazardous waste clean-ups, or whathave you—it is a notoriously unreliable and otherwise dangerous tool that is prone to lead to protection not of public, occupational and environmental health, but of the status quo—that is, of continued pollution and exposure of the public to toxic chemicals, of what, in fact, is a *de facto* "right to pollute." As the Office of Science and Technology Policy has cautioned, the present methodologies of risk assessment contain a number of built-in uncertainties, and decision-makers should not rely too heavily on risk estimates derived from current state-of-the-art models and approaches." (cf. Office of Science and Technology Policy, *Chemical Carcinogens: Review of the Science and Its Associated Principles*, 49 Fed Reg 21594-21956).

Against this historic "right to pollute," I want to set the more basic "right not to be poisoned," and, if we are being poisoned, the right to know how, and by what and by whom. And, maybe even more basic than the right to know, the right to *say* No to unnecessary exposure and risk.

Quantitative risk assessment is a throwback to the Reagan era when policymakers liked to believe that everything could be reduced to accounting terms. (In that respect, risk assessment fits nicely into the same economic attitude that produced Michael Milken and Charles Keating.)

But to use that kind of approach to policymaking for non- and low-threshold toxins is to apply 18thC socio-economic theory to 20th and 21<sup>st</sup> C technology. It just doesn't fit. Adam Smith and David Ricardo not only didn't know anything about dioxin and estrogenic mimickers, they were typical of their time in not caring much at all about our modern concepts of democracy based on the rights of every individual. They really believed that the public good is best served by private greed. Today I would hope we know better.

Given what we know and don't know today about non-threshold toxins, low-dose response,



subtle mechanisms of effect and biological pathways, cumulative effects, transgenerational mutation, etc., the appropriate response is not risk assessment but prevention. Prevention is the basis of the Delaney Clause and what in broader terms nowadays we call the Precautionary Principle—which is essentially the same old basic principle of public health which we used to call the Principle of Prudence. Simply stated, that means that in the face of uncertainty, if we're going to err, it should be on the side of caution.

In the absence of knowledge, exposure should be considered tantamount to effect and avoided wherever possible.

Delaney had the right idea, but the Delaney Clause is limited. Even if it were enforced (which it hasn't been as far as pesticides are concerned), and even if it could remain intact (which it probably can't, given the reactionary mindset of the powers that be), it applies only to carcinogens and only to processed foods.

What we need is an enforceable, truly preventative law that prevents exposure not only to known carcinogens (what EPA calls Class A and B), but to other kinds of toxins like teratogens, endocrine disrupters, neurotoxins, those that cause immune-system or reproductive system disorders, etc.

And for those we aren't sure about, like the Class C carcinogens—those that tests show causing cancer in one animal but not two, for instance, then we should at least be told that we're being exposed to them. That is, again, if we're not going to have exposure prevented, we have the right to know what we're being exposed to. *The Food, Drug and Cosmetic Act* law should provide for disclosure in the form of labeling so we at least know what pesticides are in the food before we buy it.

But right to know is a fall back position. The first step in prevention is to ban those chemicals we know about. And that we can already do in many cases, because we know that there are non-toxic or less-toxic alternatives already available. For those we don't have immediate alternatives to, we should start phasing out while simultaneously using government research money and purchasing power to develop a crash program for developing those alternatives. We need to give our farmers the tools they need to stop poisoning themselves and us and the environment.

## Some Unacceptable Risks of Risk Assessment (1995)

Presented to the Arizona Commission on the Environment seminar "Perspectives on Risk Assessment," Phoenix, Arizona (7 March 1995)

Although risk assessment is often touted as "good science," it is actually not science at all but a branch of mathematics closely related to economics, a connection made explicit in the subset known as Comparative Risk Assessment (which is mainly concerned with budget-setting) and its kissing cousin, Cost-Benefit Analysis. If you want to stretch the meaning of the word "science" to include those areas, then risk assessment would have to be called "bad science." Even more important, it is bad science that leads easily to bad policy, policy in which whatever science might be available in the methodology tends to be subverted by preconceived notions of something called "acceptable risk."

All forms of risk assessment are subject to a variety of technical and conceptual weaknesses, but the main problem occurs not during the calculation phase, but when the assessment gets turned into policy, and my remarks will focus on policy issues in order to indicate at least some of the reasons why Arizona Toxics, the Sierra Club and many other environmental organizations have refused to take part in state Comparative Risk Projects, including Arizona's; and why we believe, especially in the context of anti-environment legislatures and governors who apparently haven't a clue about the difference between shortsighted economic growth and sustainable development, that CompRisk projects principally compare not risk but opinions and political clout, and are inevitably geared (and in most cases designed) to justify low health and environment budgets and toothless regulation.

Risk assessment plays with a stacked deck: it's assumptions, because they are unavoidably contaminated with unacceptable risk management goals, almost automatically assure an unacceptable outcome, if what you're after is disease and pollution prevention. There is a kind of unwritten assumption in favor of any proposal. You don't often hear, for instance, of a risk assessment deciding that a proposed project should be dropped. In real life, risk assessment is not an impartial tool for evaluation, but almost always is used to serve preordained economic goals. As former EPA Administrator William Ruckelshaus said, "if you torture [risk assessment data] long enough it will tell you anything you want to know." And that's why we agree with the Office of Technology Assessment that "risk assessment is by all accounts merely an estimation technique and misapplied in a regulatory standard-setting process" (OTA, testimony before US Senate Hearing on Sham Recycling, 14 April 1988); and with the Office of Science and Technology Policy, which has cautioned decision-makers against relying too heavily on risk assessment (OSTP, "Chemical Carcinogens: Review of the Science and Its Associated Principles," 49 FedReg 21594-21596); and with a recent article in the journal of the American Biological Society which said:

Reducing decision making to comparative risk assessment presupposes that quantitative factors are more important than ethical values such as equity. Yet quantitative comparisons ignore questions such as who performs the assessment, how the risk factors are averaged, who is put at risk, why they are at risk, who pays to reduce the risk, who benefits from the risk, and who consents to the risk. No scientific technique can justify imposing hazards on a community without answering such questions. Scientific techniques such as comparative risk assessments are necessary but not sufficient for sound environmental policy. To assume that they are sufficient is to confuse facts with values, technocracy with democracy.

Kristin Shrader-Frechette, *BioScience* 45(2)

Quantitative risk assessment, which is the basis of the other forms, typically is a fixed computer game with results bought and paid for by the advocates of environmentally threatening projects. Historically speaking, its various mutations are part of the reactionary, anti-regulatory agenda of the Reagan-Bush era that has come to a head with the current GOP Contract on America, which seeks to repeal environmental protection to the extent possible, tie up what it can't repeal in bureaucratic boondoggles that disenfranchise the majority with quasi-scientific gobbledegook, and in place of government regulation would subject us to the tender mercies of private enterprises' self-interest.

As policy tools, all forms of risk assessment present an enormous ethical problem in a supposedly democratic society. Their use brings us smack up against the perennial tension in American society between the belief in political freedom and equality and the contradictory demand of some for economic liberty, the right of individuals to rise in status on the backs of their fellow citizens and others. Furthermore, at their very core, both ethically and technically, they start from wrong assumptions and ask the wrong questions and then build their answers on the shaky ground of data gaps, variabilities, inferences, arbitrary defaults, and other uncertainties.

Among other technical assumptions, for instance, risk assessment typically:

- Assumes—contrary to obvious fact—that we have (or ever will have) sufficient health and ecological data on chemicals to accurately assess and compare risks
- Assumes that crude estimates or models based on selective or averaged data (e.g., "prevailing winds," "annual emissions," "70 kg adult white males," "two-gallons of water intake/day") can adequately portray actual exposures and account for risks to non-statistical individuals
- Assumes that risk can be accurately assessed in terms of one or another toxic in one or another part of the environment—in the water or air or food—rather than requiring assessment of cumulative risks in all media
- Assumes that risks can be isolated and weighed individually, one at a time or in arbitrary groupings, without taking into account the multiple exposures to the multiple pollutants we're all exposed to (that the risks of mercury, for instance, can be assessed apart from the risks of lead and sulfur; that the risks from dioxin can be assessed independently from the risks from solvents or PVC or the thousands of other organochlorines put into our biosystems by industry, or from toxics use per se)
- Assumes that arbitrary so-called "safety factors" adequately compensate for a multitude of uncertainties
- Assumes that the probability of cancer is an adequate measure
- Assumes that identifiable adverse effects on humans alone are adequate measures
- And finally, assumes that the outdated assimilative capacity theory—the juvenile attitude that Mother Nature will clean up the little messes we make—is a valid principle for toxic chemicals in a world of five billion plus people, that it's ok to keep polluting as long as it's only a little bit here/a little bit there, that dilution is the solution to pollution

Among the socio-political assumptions, risk assessment typically:

- Assumes, in accordance with the Assimilative Capacity theory, that there is a corporate "right to pollute" (i.e., up to a legal limit) equivalent to or greater than the right of individuals not to be polluted
- Assumes that chemicals (both as raw materials and as waste products) are innocent until proved guilty, that what we don't know not only can't hurt us, but that it should be allowed to keep on being put into our environment and bodies until we have proof positive down to the last molecule that it's a killer
- Assumes that there is a "scientific", (i.e., unwaveringly correct, bright line) answer to environmental problems, and that environmental management should be based on it, when we all know that "good science" is always being revised, that yesterday's "safe" chemical is often today's virulent poison
- Assumes that economic growth—defined as new and expanding enterprise and increased production of so-called "goods"—is desirable unless it is "proved" (again, absolutely, beyond a shadow of a doubt) that the benefits are outweighed by loss of natural resources, life, liberty and, maybe, the pursuit of happiness
- Assumes that money not spent on regulating one threat will be spent on another more serious threat rather than being gobbled up in the general fund or some such
- Assumes that money is the appropriate measure of human life, human suffering, and environmental damage—an assumption that has been known to lead assessors into the absurdity of actually placing a price on the lives of children as though environmental protection were some kind of insurance racket
- Assumes that productivity, not quality of life, is an adequate measure
- Assumes that economic risks—calculated in outmoded terms that ignore natural resource depletion and otherwise discount the future—can be compared to health and environmental risks
- Assumes that economic demands are equivalent to survival needs
- Assumes that economic growth and production can increase forever in a world of finite natural resources
- Assumes that planning horizons of 5-10 years are reasonable even when the effects of our activities can last for 1000's
- Assumes that long-term future risks of contaminated sites can be determined from current proposed uses of the sites
- Assumes that the benefits to society as a whole outweigh the needs of minorities and non-human communities
- Assumes that complex environmental decisions can only be made by technical specialists who determine risk levels for the public or, alternatively (as in some CompRisk projects), assumes that the public can participate effectively and constructively in complex technical

decision-making without prior detailed training in risk assessment concepts, vocabularies and methodologies

- And finally, particularly in regard to Comparative Risk, assumes that involuntary societal risks imposed by a company for its own benefit at a cost to society and the environment at large, risks that can be reduced by government action, can be compared on the basis of probability, to voluntary individual risks where risk and benefit inhere in the same person and can be reduced by individual action. That is, it assumes, for example, that because some people are willing to take the risk of driving to work on the freeway at rush hour, that it's ok to expose whole populations (even without their prior informed consent) to a calculated smaller risk from toxic industrial air emissions.

I said at the beginning that risk assessment makes the wrong assumptions and asks the wrong questions. In general, those questions can be boiled down to "How much can we get away with?" or, in the case of CompRisk, "Which problems can we ignore?" That is, it assumes that some additional risk and disease are acceptable, or more often (based on the other assumptions), assumes that additional risk is necessary when, in fact, it may be unacceptable to the persons most at risk and be entirely unnecessary and avoidable in the first place—if different assumptions were in place, if, for instance, economic demands weren't equated with real need.

Even if we could develop a computer model sophisticated enough to accurately assess all the variables and, as EPA's science panels did a few years ago, actually decide that global warming and ozone depletion pose more important risks (i.e., are more threatening to more people) than toxic waste dumps, can we really expect people with toxic dumps in their backyards to agree that working on the hole in the ozone layer is a greater priority, that global warming is a greater risk to them? Especially when they know that rates of birth defects, childhood leukemia and other diseases are significantly higher around toxic waste sites? And if not, how do we weigh in the voices of these people when we actually come to regulatory action after all our assessments? Are we just going to ignore them? Aren't we likely, instead, to do exactly what we do now, without spending the time and money on CompRisk projects?

All these technical and political assumptions indicate that the risk assessment concept is based on the dog-eat-dog scarcity model of 18th century classical so-called "rational" economic theory—the same kind of liberal elitist thinking that gave us the depravities of social Darwinism and robber barons in the 19th century and has trickled down to us in the 20th century in the form of white supremacy, Thatcherism, Reaganism, consumerism, white middleclass male backlash and other unwise-use movements.

Risk assessment is flawed as a scientific instrument and as an instrument of policy is even worse—irremediably warped by 18th century economic ideology, fundamentally undemocratic, inequitable, and, in the hands of policy-makers whose basic philosophy is also undemocratic and unconcerned with the long-term issues of sustainability, it easily becomes (in developing nations trying to become partners in the global market, for instance) a tool of repression, oppression and, if carried to its logical (i.e. "rational") conclusion, genocide and ecocide—both of which have become identifying characteristics of our time period in history and our peculiar culture (which I honestly hesitate these days to call "civilization"). To a classical liberal or neo-liberal political economist, of course, it is "rational" to bankrupt your competitor and pay your workers as little as possible and sweep your waste products under the rug or into the ocean or wind, as long as you don't have to pay for it, as long as your short-term profits continue.

We all recognize the contradictions and absurdities in that kind of thinking when it's put in those terms, but we tend to miss them when they're locked up in pseudo-scientific formulas and

jingoistic buzzwords like "free enterprise," "free trade," "property rights" and "good science."

One of my favorite illustrations of the injustice inherent in risk assessment as a policy tool is the shotgun analogy. If we assume for a moment that someone can know with absolute certainty that firing a shotgun into a room that contains one million people will kill only one of them, can we then justify that shot on the grounds that the person firing the gun will somehow benefit economically or did not know which person would be killed? Obviously not. No matter what the benefits to the gunner or the anonymity of the victim, we would call that murder. Yet that is exactly what we do with a regulatory policy that allows a polluter to emit toxics to the limit of a one in a million risk. Pollution limitations based on risk assessment are, in effect, legalized homicide and ecocide. What risk assessment apologists like to call acceptable risks are not likely to be acceptable at all to the individual victims. In fact, the term "acceptable risk" is highly, almost deliberately, misleading; it should be replaced with a more accurate term like "allowable risk."

In either case, the phrase begs the questions of "acceptable to whom?" "to whose benefit" "on whose say so?" The regulatory decision to allow such legalized murder is based on a comparative risk assumption that the benefits of allowing a polluting operation to begin or continue outweigh that one allowable death, an assumption that some individuals and some populations are expendable or of negligible value and, like some problems, can be ignored. The basic inequity between who benefits and who bears the risks can be seen clearly when we recognize that our worst-polluting industry has been, and continues to be, built in low-income communities and communities of color. You just don't see many factories in Scottsdale.

I suggest to you that these calculated assumptions, the bottom line in risk assessment, that the good of society, the public good, depends on the ability of the private enterprise to pollute, that what's good for business is good for the country—are ideological hogwash, that no private enterprise is worth the death of any one person.

And I also suggest to you that modern technology not only can but must find ways to become non-polluting, that the world situation is already too far along the path of destruction to allow more junk in the system; that the whining of business that it can't survive with stricter limits means only that business is more concerned with doing business as usual, with protecting an unsustainable elitist lifestyle, than with life itself; that the problem is not technological but political; and that until risk assessors and policy-makers are willing and able to figure in zero discharge and zero toxic air emissions and zero incremental loading of the environment as the baseline in their computer games; and until risk assessments can be done in a society that requires corporate responsibility instead of the current corporate anarchy—a society that requires us to compare the demand for more widgets against the need to stop poisoning the world, then we should stop wasting our money on these expensive little assessment exercises and spend it instead on health care and on educating our children to cope with the mess we're leaving them.

More than just being stupidly shortsighted, it's blatantly immoral to even consider (as the Arizona legislators are) passing a law to promote production of CFCs or basing waste-site clean-up standards on short-term projections of future site use, or to consider (as some deepthinkers are) making Palo Verde the nation's nuclear waste repository. Similarly, it is worse than absurd (as EPA and ADEQ have proposed) to allow construction in the desert of a paper mill that will consume billions of gallons of water in its short lifetime; discharge 6 million gallons of it a day into the Santa Cruz River and onto croplands as wastewater contaminated with millions of pounds of carcinogenic metals, solvents and other toxics; spew some 14 million pounds of pollutants into our air; and produce some 20,000 pounds per day of contaminated sludge to be dumped in a nearby landfill dug at public expense. Whether or not that is legal under our

assimilative capacity-based laws or allowable under our risk models, I can only think of it as something like criminally insane, a crime against nature and humankind, to continue poisoning ourselves and our children that way, especially when it's done by a company that has been invited into the state to the tune of several million dollars in tax breaks.

So what is the alternative? Well, to start with, we should step away from our chauvinistic perspective to get some overview, assume that we're dealing with more than state or local problems, that state economic growth is not the issue but planetary survival is—and that it's everybody's problem, not just "those guys over there" in other states and other countries; that it's especially the problem of those of us who live this wasteful, industrialized lifestyle that is responsible for 80-90% of the world's hazardous waste and pollution and for consumption of similar percentages of the world's resources. We need to recognize that no matter what "rational" economics might say, in the face of conditions like global warming, increasing male sterility and other epidemic reproductive problems, holes in the ozone layer, species extinction, etc., it is morally and ethically wrong and just plain dumb to keep treating our environmental life support system as a dump.

Some of the innovative steps the Arizona CompRisk Project has taken to mitigate the inherent problems—like seriously trying to involve the public in the process, trying honestly to figure a public values assessment into the equations—are steps in the right direction, but given the massive institutional resistance to fundamental change in the way we do business, and the unpromising risk assessment context in the first place, and the continued failure to actually fund public participation, I can't help but wonder what use will be made of all the public input by the actual decision-makers and can't help but believe that such comparatively small and isolated efforts at participatory democracy have little chance of actually changing the system.

To really make headway, we're going to have to realize, as individuals and as a society, that it's time to start building a new paradigm, start taking sustainability seriously, start looking for real alternatives to business as usual; to start, for instance, using natural resource accounting and quality of life indices rather than production numbers to figure our costs and benefits; to start getting serious about requiring best available technologies; and, especially, to start asking the right questions: like, instead of asking how few molecules of methyl-ethyl-bad-stuff it takes to mutate how many genes, how much we can get away with—how much pollution, how much deforestation, how much desertification, how much pavement—we have to start asking how much damage we can avoid, what can be done to cause the least harm, how much is good for us, how can we live—and let future generations live—not off the world but with it; how we can keep our obligation to those future generations to pass on a world with as many or more natural resources—uncontaminated resources: open space, clean air and water and our food—as we were heir to. That seems to me to be an American Dream worth trying to make real and I don't see how risk assessment in any of its forms is going to be much help in getting us there.

## **Risk Assessment and Risk-Based Policy: A Grassroots Perspective from the Ground Zero Perspective (1997)**

Michael Gregory, presented to the Risk Assessment and Policy Association International Meeting, Alexandria, Virginia, (6-7 March 1997)

Although risk assessment is often touted as "good science," it is actually not science at all but a branch of mathematics closely related to economics, a connection made explicit in the subset known as Comparative Risk Assessment (CompRisk) and its kissing cousin, Cost-Benefit Analysis. If you want to stretch the meaning of the word "science" to include those areas, then risk assessment would have to be called "bad science." Even more important, it is bad science that leads easily to bad policy.

Most of us would agree, I hope, that all forms of risk assessment are subject to a variety of technical and conceptual weaknesses. From the point of view of grassroots environmental and community organizations, the main problem with risk assessment occurs not during the calculation phase, but when these weaknesses get turned into policy—whether for site-specific decision-making, standard-setting, statutory strait jackets as proposed by the 104<sup>th</sup> Congress (and being re-proposed in the 105<sup>th</sup>), or in the more insidious form of international trade agreement rules.<sup>1</sup>

That international aspect may be the most dangerous in the long run. All recent Administrations have pushed risk assessment as a fundamental operating procedure of trade agreements (including the World Trade Organization and NAFTA, and Chile's upcoming accession to "Son of NAFTA," whatever it turns out to be called), so that risk assessment as interpreted by non-elected trade panels becomes the test of whether or not a nation's environmental law can be ruled illegal as a barrier to free trade.<sup>2</sup>

Although I will be talking about our experience with quantitative risk assessment (QRA) in general, my remarks will be especially colored by grassroots experience with anti-environment state legislatures and governors who apparently haven't a clue about the difference between shortsighted economic growth and sustainable development, and with state-level CompRisk projects that principally compare not risk but opinions and political clout, and are inevitably geared (and in most cases designed) to justify low health and environment budgets and toothless regulation.

In practice, that is, in the field as opposed to the classroom or boardroom, quantitative risk assessment, which is the basis of the other forms, is not an impartial tool for evaluation, but typically is a fixed computer game with results bought and paid for by the advocates of environmentally threatening projects to serve preordained economic goals.

Risk assessment plays with a stacked deck: its assumptions, because they are unavoidably contaminated with unacceptable risk management goals,<sup>3</sup> almost automatically assure an unacceptable outcome, if what you're after is disease and pollution prevention. There is a kind of unwritten presumption in favor of any proposal on the grounds of economic growth. You don't often hear, for instance, of a risk-based decision to drop a proposed project; although modifications are sometimes made in planned or existing operations to lower the calculated risk, far more often adjustments are made to the calculations, tweaking the model so it fits the plan. As former EPA Administrator William Ruckelshaus said, "if you torture [the data] long enough it will tell you anything you want to know." Or, as someone else recently said, "There's lies, damned lies, and then there's risk assessment."



One of the most succinct statements of the problems with reducing policy decisions to CompRisk was made by Dr Shrader-Frechette in the February 1995 issue of *BioScience* 45(2):

Reducing decision making to comparative risk assessment presupposes that quantitative factors are more important than ethical values such as equity. Yet quantitative comparisons ignore questions such as who performs the assessment, how the risk factors are averaged, who is put at risk, why they are at risk, who pays to reduce the risk, who benefits from the risk, and who consents to the risk. No scientific technique can justify imposing hazards on a community without answering such questions. Scientific techniques such as comparative risk assessments are necessary but not sufficient for sound environmental policy. To assume that they are sufficient is to confuse facts with values, technocracy with democracy<sup>4</sup>.

Historically speaking, although regulatory use of risk assessment began first with FDA and then EPA and OSHA in the 1970s (following the creation of the latter two agencies concurrently with President Nixon's 1971 declaration of a "war on cancer"), quantitative risk assessment as we know it began in earnest with the reappointment of Ruckelshaus in the wake of scandals at the Reagan EPA in the early 1980s. Its various mutations are part of the reactionary, anti-regulatory agenda of the Reagan-Bush era that came to a head with the recent Contract on America, by seeking to repeal environmental protection to the extent possible, tie up what it couldn't repeal in bureaucratic boondoggles that disenfranchise the majority with quasi-scientific gobbledegook, and in place of protective government regulation subject us to the tender mercies of corporate giants who manipulate the world market in collusion with some governments to extract short-term private profit from the earth and its inhabitants.

As defaults or substitutes for policy decisions, all forms of risk assessment present an enormous ethical problem in a supposedly democratic society. Their use as policy tools brings us smack up against the perennial tension in American society between the belief in personal political *freedom* and *equality* and the contradictory demand of some for government-guaranteed economic *liberty*, the right of individuals to rise in status on the backs of their fellow citizens and others. Furthermore, at their very core, both ethically and technically, risk assessments start from wrong premises, ask the wrong questions and then build their answers on the shaky ground of data gaps, variabilities, inferences, arbitrary defaults, and other uncertainties.

Despite the intense criticism in the past few years that has led to some spotty improvements in the field, the following lists of technical and social assumptions in risk-based policy largely still hold true. Among other technical matters, for instance, risk-based policies typically:

- Assume—contrary to obvious fact—that we have (or ever will have) sufficient health and ecological data on chemicals to accurately assess and compare risks, especially with 1000 or so incompletely tested new substances entering the market every year to join the tens of thousands of untested substances already there

- Assume that crude estimates or models based on selective or averaged data (e.g., "prevailing winds," "annual emissions," "70 kg adult white males," "two-gallons of water intake/day") can adequately portray actual exposures and account for risks to non-statistical individuals

- Assume that risk can be accurately assessed in terms of one or another toxic in one or another part of the environment—in the water or air or food—rather than requiring assessment of cumulative risks in all media

- Assume that risks can be isolated and weighed individually, one at a time or in arbitrary groupings, without taking into account the multiple exposures to the multiple pollutants we're all exposed to
- Assume when multiple exposures *are* assessed, that an additive rather than synergistic accounting of effects is sufficient
- Assume that so-called "safety factors" arbitrarily established 50 years ago adequately compensate for a multitude of uncertainties
- Assume that reasonable estimates of risk can be made without considering total system failure
- Assume that the probability of cancer is an adequate measure
- Assume that identifiable adverse effects on humans alone are adequate measures
- And finally, assume, in utter disregard of the peculiarly 20<sup>th</sup>C problems presented by the scale of our technological enterprise in the world market, and disregard of the *unnatural* characteristics of our toxic outputs, that the outdated Assimilative Capacity theory—the juvenile attitude that Mother Nature will clean up the little messes we make—is a valid principle for toxic chemicals in a world of five billion plus people, that it's ok to keep polluting as long as it's only a little bit here/a little bit there, that dilution is the solution to pollution

Among the socio-political assumptions, risk-based policies typically:

- Assume, in accordance with the Assimilative Capacity theory, that there is a corporate "right to pollute" (i.e., up to a legal limit) equivalent to or greater than the rights of individuals and the environment not to be polluted
- Assume, in direct contravention of the Precautionary Principle, that chemicals are innocent until proved guilty, that what we don't know not only can't hurt us, but that it should be allowed to keep on being put into our environment and bodies until we have proof positive down to the last molecule that it's a killer
- Assume that there is a "scientific", bright line, "final solution" to environmental problems, and that environmental management should be based on it, when we all know that "good science" is always being revised, that yesterday's "safe" chemical is often today's poison
- Assume that economic growth—defined as new and expanding enterprise and increased production of so-called "goods"—is desirable unless it is "proved" (again, absolutely, beyond a shadow of a doubt) that the benefits are outweighed by loss of life, liberty, property, natural resources (more or less in that order) and, maybe, the pursuit of happiness
- Assume that money not spent on regulating one threat will be spent on another more serious threat rather than being gobbled up in the general fund, weapons, corporate bail-outs, or some such
- Assume that economic risks—calculated in outmoded terms that ignore natural resource depletion and otherwise discount the future—can be compared to health and environmental risks
- Assume that money is the appropriate measure of human life, human suffering, and

environmental damage—an assumption that has been known to lead assessors into the absurdity of actually placing a price on the lives of children as though environmental protection were some kind of insurance racket

- Assume that productivity, not quality of life, is an adequate measure
- Assume that economic *demands* are equivalent to survival *needs*
- Assume that economic growth and production can increase forever in a world of finite natural resources
- Assume that long-term future risks of contaminated sites can be determined from current proposed uses of the sites
- Assume that planning horizons of 5-30 years are “long-term” and reasonable even when the effects of our activities can last for 1000's
- Assume that benefits to society as a whole outweigh the needs of individuals, minorities and non-human communities
- Assume that an unlucky few are expendable for the market-defined benefit of others
- Assume that complex environmental decisions can be made only by technical specialists who determine risk levels for the public or, alternatively (as in some CompRisk projects), assume that the public can participate effectively and constructively in complex technical decision-making without prior detailed training in risk assessment concepts, vocabularies and methodologies and without compensation for time
- Assume that risk (rather than, say, bodily invasion of privacy) is the appropriate measure for controlling waste
- And finally, particularly in regard to Comparative Risk, assume that involuntary risks imposed by a company for its own benefit at a cost to society and the environment (risks that can be reduced by government action), are comparable on the basis of probability to voluntary individual risks (where risk and benefit inhere in the same person and can be reduced by individual action). That is, assume, for example, that because some people are willing to risk driving to work on the freeway at rush hour, that it's ok to expose whole populations (even without their prior informed consent) to a calculated risk from toxic industrial air emissions or wholesale pesticide spraying.

I said at the beginning that risk assessment makes the wrong assumptions and asks the wrong questions. In general, those questions can be boiled down to "How much can we get away with?" or, in the case of CompRisk, "Which problems can we ignore?" That is, it assumes that some additional risk and disease are acceptable, or even *necessary* when, in fact, they may be unacceptable (especially to the persons most at risk), as well as entirely unnecessary and avoidable in the first place—if different assumptions were in place—if, for instance, artificial economic *demands* weren't equated with real human *need*, or if chemical trespass were condemned as strongly as the wanton dispersal of other forms of trash.

Risk-based policies are founded on the dog-eat-dog scarcity model of 18<sup>th</sup> century classical (so-called "rational") economic theory—the same kind of liberal elitist thinking that gave us the depravities of social Darwinism and robber barons in the 19<sup>th</sup> century and has trickled down to us

in the 20<sup>th</sup> century in the form of white supremacy, Thatcherism, Reaganism, consumerism, white middleclass male backlash and other unwise-use movements. Our new anti-welfare system is another case in point.

As a scientific instrument, and as an instrument of policy, risk assessment is irremediably warped by 18<sup>th</sup> century economic ideology, fundamentally undemocratic, inequitable, and, in the hands of policy-makers whose basic philosophy is also undemocratic and unconcerned with the long-term issues of sustainability, it easily becomes a tool of repression, oppression and, if carried to its logical (i.e. "rational") conclusion, genocide and ecocide —both of which have become identifying characteristics of our period in history and our peculiar culture, particularly well-documented in the developing world but certainly not unknown in the industrialized countries. To a classical liberal or neo-liberal political economist, of course, it is "rational" to bankrupt your competitor and pay your workers as little as possible and sweep your waste products under the rug or into the ocean or wind, as long as you don't have to pay for it, as long as your short-term profits continue.

We all recognize the contradictions and absurdities in that kind of thinking when it's put in those terms, but we tend to miss them when they're locked up in pseudo-scientific formulas and in jingoistic buzzwords like "free enterprise," "free trade," "property rights" and "good science" and, as a result, we lose a little more democracy.

For instance, to many members of the lay public (already cowed by technical jargon and esoteric processes and conditioned with gadgets into the service of consumerist technocracy), the apparent unanimity (some would say conspiracy) of industry and government expert opinion on the validity of risk assessment makes pollution (like industrialization, population growth, dominant economic systems and other macro-conditions) seem inevitable and, therefore, almost natural—which is to say, unquestionable.

The unanimity itself results in great part from the same economic agenda. For example, since the Reagan era, EPA and other regulatory agencies, with industry encouragement, have come to believe that their role is less to evaluate and enforce permits than to issue them, and to manage risks rather than prevent them. Defunding of environmental agencies has led increasingly to their dependence on industry's calculations, to the point that lack of funding is frequently cited as a justification for deregulation; in the process, the regulatory apparatus has been subverted to service of economic growth and they "have turned the toxicological concept of risk into a regulatory obstacle for implementation of pollution prevention."<sup>5</sup>

CompRisk is especially driven by budget priorities—which, of course, typically are not the priorities of most people, but of an economic elite. Although it's painfully obvious that the peace dividend has been swallowed whole by the usual dinosaurs, even the most economically illiterate ought to be able to see that a society that can afford to pay its CEOs and ballplayers multi-million dollar salaries is not suffering from a lack of cash. It's not that we *can't* clean up our act: it's that we *won't*. And that begs a basic question of democracy: who *we* are, a question that grows in seriousness as the income gap in our society continues to grow and globalization spreads.

There are, of course, some differences between 18<sup>th</sup>C and 20<sup>th</sup>C ways of doing business; for one thing, in the 20<sup>th</sup>C we've discarded the externalities of Christian charity that Adam Smith insisted had to glove the Invisible Hand: we don't have poorhouses now, and workfare—the contemporary version of the workhouse—doesn't own up to the fact that in our society (unlike Smith's) there aren't enough jobs to go around, that the system requires or forces a certain percentage of the workforce (7.5% is a figure I've recently read) to be unemployed as a hedge

against inflation and for the benefit of the investing class. It wasn't just Malthus that Carlyle had in mind when he called economics the "dismal science."

One of my favorite illustrations of the injustice inherent in risk assessment as a policy tool is the shotgun analogy first proposed, I think, by Paul Merrell.<sup>6</sup> If we assume for a moment that someone can know with absolute certainty that firing a shotgun into a room that contains one million people will kill only one of them, can we then justify that shot on the grounds that 1) only one person was at risk, or 2) that the person firing the gun will somehow benefit economically, or 3) that we did not know which person would be killed? Obviously not. No matter what the benefits to the gunner or the anonymity of the victim, we call that murder. Yet that is exactly what we do with a regulatory policy that allows a polluter to emit toxics to the limit of a one in a million risk. Conversely, although we prohibit firing from our property at kids on their way to school, we routinely permit polluters to kill them with risk-based justifications.

Risk-based policies are, in effect, legalized homicide and ecocide; risk assessments take the place of our Constitutional right to due process. What risk assessment apologists like to call acceptable risks are not likely to be acceptable at all to the individual victims. In fact, the term "acceptable risk" is highly, almost deliberately, misleading; it should be replaced with more accurate terms like "allowable risk" or "permitted death."

In any case, the phrase begs the questions of "acceptable to whom?" "to whose benefit," "on whose say so?" The regulatory decision to allow such legalized mayhem is based on a calculated risk assumption that the benefits of allowing a polluting operation to begin or continue outweigh that one death in a million or one hundred thousand, an assumption that some individuals and some populations are expendable or of negligible value and, like some problems, can be ignored. The basic inequity between who benefits and who bears the risks can be seen clearly when we recognize that our worst-polluting industry has been, and continues to be, built in low-income communities and communities of color. You just don't see many factories and incinerators in Aspen, Scottsdale and Beverly Hills.

Let me suggest to you that the bottom line presumption in risk-based policies—that the good of society, the public good, depends on the ability of private enterprise to pollute, that what's good for business is good for the country—is ideological hogwash and that no private enterprise is worth the death of any one person.

It is well past time, especially in light of the globalization of industry, to drop the Assimilative Capacity/Acceptable Risk model that underlies so much of our environmental law and our risk assessments. Like the neo-liberal economists who see a rosy environmental future once everyone is safely ensconced in the world market and gratefully partaking of the higher incomes it is bound to bring, risk assessments—largely on the basis of Assimilative Capacity theory—tend to make a sharp disconnect between "local" and "global" environmental problems.<sup>7</sup>

A book review by economist Lester Thurow in this month's *Atlantic Monthly* is a case in point. After noting that "[l]ocal environmental problems. . .are not automatically addressed by the market," Thurow goes on with utter disregard of history, cultural diversity and political reality to posit that "the desire of consumer-voters to live in a clean, healthful environment is going to lead to government regulations that quickly force the market to clean up its act" and that "[a]s incomes rise in the developing world, voters will have an equal interest in a livable environment"; he then throws in the towel when it comes to global warming and the ozone layer, noting that "both the market and the political process fail. . .in dealing with global environmental issues"—as though polluted rivers, aquifers, smog, subdivisions and the like weren't the direct cause of ozone layer destruction, rainforest destruction, DDT and PCBs in the polar ice caps, etc.

The global village is a polluted village, and it gets polluted one molecule at a time, one strawberry field at a time, one watershed or airshed at a time, one permit to pollute, one risk assessment at a time.

Scale is a determining factor, maybe *the* primary factor, in sustainability and a principal reason (along with unnatural persistence and bioaccumulativity) that the Assimilative Capacity model is bankrupt. And the problem can only get worse with the exponential growth of population and industrial globalization.<sup>8</sup> Yet our environmental protection laws and, consequently, our risk assessments, continue to be based on the Assimilative Capacity model. It is morally as well as technically deceitful to continue to pretend that local actions do not have global consequences, as though the basic law of ecology did not exist.

Many of the problems with risk assessment in relation to the world market are exactly local problems. Pesticides manufactured in the US, for instance, are often accepted into southern countries on the strength of the EPA's risk-based registration materials, despite the differences in temperature, climate and other exposure factors (including, e.g., volatility, root and foliar uptake); population susceptibilities; toxicokinetics; occupational and ecological conditions, and so forth.<sup>9</sup> The well-documented environmental justice issues involved with risk assessment in this country are magnified many times over in developing countries.

So what is the alternative? Well, to start with, we should step away from our chauvinistic perspective to get some overview, get a grip on the fact that those of us who live this wasteful, industrialized lifestyle are responsible for 80-90% of the world's hazardous waste and pollution and for consumption of similar percentages of the world's resources. Again, the issue of *scale*. We need to recognize that no matter what "rational" economics might say, in the face of conditions like global warming, increasing male sterility and other epidemic reproductive problems, holes in the ozone layer, species extinction, etc., it is morally and ethically wrong and just plain dumb to keep treating our environmental life support system as a dump. We have to stop trying to address our 20<sup>th</sup> and 21<sup>st</sup> C toxics issues with 18<sup>th</sup> C economic philosophy.

Modern technology not only can but must find ways to become non-polluting. The world is already too far along the path of destruction to allow more junk in the system and the whining of industry that it can't survive with stricter limits means only that industry is more concerned with doing business as usual, with protecting an unsustainable elitist lifestyle, than with life itself. The problem is not technological but political, and until risk assessors and policy-makers are willing and able to figure in zero discharge and zero toxic air emissions and zero incremental loading of the environment as the benchmarks and endpoints in their computer games; and until risk assessments can be done in a society that requires corporate responsibility instead of promoting corporate anarchy—a society that requires us to compare the demand for more widgets against the need to stop poisoning the world, then we should stop wasting our money on these expensive little assessment exercises and spend it instead on universal health care, moon suits, and on educating our children to cope with the mess we're leaving them.

One essential step is to seriously involve the public, trying honestly both to de-mystify the process and to figure a *public values assessment* into the equations. Given the massive institutional resistance to fundamental change in the way we do business, and the unpromising risk assessment context in the first place, and the continued failure to actually fund public participation, I'm not optimistic. But if there is an answer, I have to believe it lies in the direction of greater participatory democracy, not more disenfranchisement.

Most people, intelligently enough, do not particularly care how many parts per billion it takes to

kill or maim us. What we want is *hazard identification, elimination and alternatives analysis*, the basic qualitative elements of the Health Risk Assessment and Environmental Impact Assessment processes that preceded QRA as the dominant methodologies.

It is, of course, no accident that those are exactly the steps of the QRA process that the Reagan-era EPA and National Research Council began trying to downplay and that pro-pollution interests have been trying to quash every since.<sup>10</sup> Like the concepts of zero discharge and non-migration of pollutants, unalloyed hazard identification is disliked by polluting industries because hazard identification says that a given substance, due to its essential properties, its *qualities*, constitutes an intrinsic hazard, in and of itself, apart from any exposure or risk management scenarios. Hazard identification leads to *lists* of hazardous substances and allows for straightforward accounts of what, if anything, is being done to eliminate or mitigate those hazards. What risk assessment does is take this relatively straightforward information and put it in terms no one can understand.

Hazard identification and reduction are also, appropriately, identical to the major steps in emergency planning, since we are, in fact, in a global emergency situation. What else can we call it when young mothers trying to decide whether to breastfeed have to consider that their milk may be more toxic than the law allows commercial milk to be? and when whales washing up on our beaches contain so much PCB they could be classified as toxic waste under US law?<sup>11</sup> and when, as EPA's Dioxin Reassessment tells us, "some of the [adverse] effects of dioxin and related compounds have been observed in laboratory animals and humans at or near levels to which people in the general population are exposed."<sup>12</sup>

A great deal of professional time and money have been put into "risk communication," by which is usually meant a PR effort to convince communities that the risk is acceptable. We would do better to focus on "*hazard communication*," especially in developing countries. Although it is rarely adhered to, a model for such communication has already been worked out and agreed to internationally. It's called the *London Guidelines on the Exchange of Information on Chemicals in International Trade*. The voluntary Guidelines are administered by the UN Environment Program and incorporate a set of educational and informational steps to be taken to guarantee Prior Informed Consent of those nations receiving chemicals. The London Guidelines would not be a bad place to start communicating with communities in this country as well as the developing world, since many of the basic educational steps as a rule are not followed here either.

We need to require more thorough testing of *all* substances and prohibit their commercialization unless they are shown to be truly benign or unless there is an overwhelming demonstrated public need for them, and make all information on them public, starting with EPA's TSCA (Toxic Substances Control Act) database, which should be made part of the substance-specific and source-specific Toxic Release Inventory distributed annually to the public.

But while information is important, it's not the same as participation. To really make headway, we're going to have to realize, as individuals and as a society, that it's time to start building a new paradigm, start taking sustainability seriously, start looking for real alternatives to business as usual; to start, for instance, really making communities a part of the decision-making that affects their lives, providing compensation for community representatives so they can afford to participate on equal footing; to start using natural resource accounting and quality of life indices rather than production numbers to figure our costs and benefits, to make clear distinctions between *sales demand* and *societal need*; to start getting serious about requiring best available technologies; and, especially, to start asking the right questions: like, instead of asking how few molecules of methyl-ethyl-bad-stuff it takes to mutate how many genes, how much we can get

away with—how much pollution, how much deforestation, how much desertification, how much pavement, how much death—we have to start asking how much damage we can avoid, what can be done to cause the least harm, how much is good for us, how can we live—and let future generations live—not off the world but with it; how we can keep our obligation to those future generations to pass on a world with as many or more natural resources—uncontaminated resources: open space, clean air and water and food—as we were heir to. That seems to me to be an American Dream worth trying to make real—and I don't see that risk assessment or risk-banked policy in any of its forms is going to be much help in getting us there.

### *Endnotes*

1. The warnings against reducing policy to risk assessment are not new, of course, and don't come just from the grassroots. In 1988, for instance, the Office of Technology Assessment testified to Congress that "risk assessment is by all accounts merely an estimation technique and misapplied in a regulatory standard-setting process." See, OTA, testimony before US Senate Hearing on Sham Recycling, 14 April 1988

2. See Mary E. Kelly, Risk Assessment Goes International: A New Role for Trade Agreements, *Global Pesticide Campaigner* 4(1):1, 9-11.

3. Cf. Ellen Silbergeld: "it is in practice usually impossible to separate risk assessment and risk management from each other"; Risk Assessment: The Perspective and Experience of U.S. Environmentalists, *Environmental Health Perspectives* 101(2):100-104, 102 (June 1993).

4. Kristin Shrader-Frechette, Number Crunching and Comparative Assessment of Environmental Risks, *BioScience* 45(2):66.

5. Robert Ginsburg, What's In a Name? Serious Implementation of Pollution Prevention. *New Solutions* (Summer 1990), pp.54-65.

6. Paul Merrell, Negligible Risk: Premeditated Murder? *Journal of Pesticide Reform* 10(1):20-22.

7. Cf. Lester C. Thurow, The Revolution Upon Us; review of William Greider, *One World, Ready or Not: The Manic Logic of Global Capitalism*, *The Atlantic Monthly* (March 1997), pp. 97-100. After asserting that rising incomes under globalization will take care of "local" problems in short order (cf. the "trickle-down" theories in support of NAFTA a few years ago), Thurow concludes that "global" problems aren't being similarly solved because there is no consensus about them and because they degrade the quality of life too slowly to prompt action.

8. From 1970-1990, world industry grew 3%/year; if it continues at that rate, it will "double in size every 25 years, grow 16-fold every century and grow by 250 times every two centuries. Insofar as this involves a 250-fold increase in material production—or anything close to it—it is clearly unsustainable." John Bellamy Foster, The Heresy of Ecological Economics, *In These Times* (January 20, 1997), pp. 24-27, 24.

9. Cf. Lori Ann Thrupp, The Fallacy of Exporting Risk Analyses to Developing Countries, *Journal of Pesticide Reform* (Spring 1990), pp. 23-25.

10. Cf. summary of issue in *Risk Policy Report* (19 May 1995), detailing the process from EPA's combination of identification and exposure steps in its Dec. 5, 1991 *Federal Register* guidelines on developmental toxicity; and again in its February 1994 draft guidelines on reproductive toxicity; the National Research Council's concurrence in *Science and Judgment in Risk*



*Assessment* (January 1994); and the May 1995 disagreement of the Environmental Health Committee of EPA's Science Advisory Board.

11. Cf. Walter J. Rogan et al, Pollutants in Breast Milk, *New England Journal of Medicine* 302:1451 (26 June 1980) and Joseph Cummings, Extinction: The PCB Threat to Marine Mammals, *The Ecologist* 18: 193-195 (1988). I'm indebted to Peter Montague for both these references.

12. EPA, Dioxin Reassessment Document, Draft Chp., Dioxin Risk Characterization (May 2, 1994).

**X. Waste Not**