

## **II. A Little Bit Here a Little Bit There Poisons the World**

## ● A Little Bit Here a Little Bit There Poisons the World

The call for a get-together of herbicide activists in DC to address the upcoming Symposium on the Use of Herbicides in Forestry (in particular the phenoxy herbicides 2,4,5-T and 2,4-D, the two main ingredients in the defoliant Agent Orange) reached me in early January 1978. Herbicides (along with nuclear radiation and copper smelter pollution) had become for me one of the top toxics issues, so I scratched up enough winter clothes and money for the trip (including donations from friends), and when the time came, took a leave of absence from the food co-op where I worked, got on a Greyhound and headed east.

It was no secret that Department of Defense backstocks of Agent Orange and other herbicides banned in Vietnam in 1971 by international agreement (due principally to international concern about the genocidal effects of their dioxin contaminant) had been transferred from DOD to BLM, USFS and other federal agencies for use on public lands in this country. In Arizona, the disastrous results of 2,4,5-T use on the Tonto National Forest in 1969 (to kill brush and increase grass production for the benefit of private cattle growers leasing the public lands) had been publicized by Billee Shoecraft and her husband, whose homestead was sprayed in the Tonto operation.

As owners of a local radio station, active members of the Republican party, and constituents of Senator Barry Goldwater, the Shoecrafts were instrumental in getting Goldwater to have Congressional hearings held on domestic use of 2,4,5-T. Partly as result of her efforts, the US banned most agricultural uses of 2,4,5-T in 1974, but specifically exempted from the ban uses on ricefields, forests, and rangelands—a straightforward total ban being almost impossible under federal laws and regulations that (in deference to business interests) consider chemical products in general, and pesticides in particular, innocent until proved guilty, and set nearly impossible hurdles to such proof, making legal protection a drawn-out, financially difficult, chemical-by-chemical process.

Billee's book about the Tonto spraying, *Sue the Bastards*, became (along with Rachel Carson's *Silent Spring*) a scripture for the anti-herbicide movement, and was one of the major texts I referenced in writing articles on the herbicide problem. (It was from Billee's book, for instance, I learned that the FS ranger who had been in charge of the Tonto spraying was then an officer on the Apache-Sitgreaves NF where I then worked, and where it was rumored among some of the workers that Agent Orange (or its dioxin-containing contaminant, 2,4,5-T) had been sprayed, and that barrels of it were secretly buried somewhere in the forest.

Phenoxy use on public lands had caused similar problems elsewhere—in Oregon, Arkansas, Minnesota and Maine, to name a few. In Oregon, in the Alsea River watershed and other forested lands where the FS and private lumber companies were spraying clearcut areas to kill what they called “weed trees” (principally alders) and other “competing vegetation,” the number of miscarriages had grown unnaturally high, and resistance had reached the point where heavy equipment used in spray projects had been sabotaged and pilots of spray-helicopters had received death threats (e.g., placards placed on the helicopters warning, “You Fly You Die”). In Minnesota, Harmon Seaver, whose well had been contaminated with 2,4,5-T, had become an inspiration to the movement for resisting Superior NF spraying, getting arrested, and having had the jury find him not guilty on grounds that his threats to shoot down the helicopters had been in self-defense.

When I got to DC there was a snowstorm in full progress. I hadn't been to Washington since the '63 March, I had almost no money (when he heard how I came to be there, the cab driver, a Vietnam vet, didn't charge me for the drive from the bus station to the Century City address I'd

been given), and I was more than a little intimidated by the hyper-modernist high rises when I got there about 9pm. But I rang the bell, a voice over the intercom told me to come on up, I knocked on the door and when it opened was greeted by a man who looked to be in his 30s, full bushy beard and long hair, bib overalls and a big smile. I later found out that like many in the group, he was a drop-out scientist who lived in forest areas being sprayed with phenoxies. Opening his arms he said, “Welcome, brother.” For the next 50 hours or so, he and I joined the several roomfuls of activists from spray areas around the country to plan our address to the Symposium—the first official national forum on the public lands spray programs and, in effect, on the chemicals *per se*.

Rupert Cutler, President Carter’s Assistant Secretary of Agriculture for Conservation Research and Education, was persuaded that the issue was real and that our position was valid and had to be heard. He had arranged for the Symposium against the desires of the strongly pro-herbicide USDI-BLM and old-guard Green Revolution USDA. Our get-together was being funded in large part by some of the national environmental organizations and by Rodale Press and other private groups that advocated organic farming and holistic lifestyles. The donors were feeding us and providing our lodging.

Those of us who were new to the struggle were brought up to date by activists from the front lines. In my case, Oregon activists, some of whom had recently started the Citizens Against Toxic Sprays (CATS) and the Northwest Coalition for Alternatives to Pesticides (NCAP) and who lived in and were fighting to protect lands like those in the Alsea watershed, made the issues and options particularly clear. Many of us were up all night preparing papers for our respective groups (as I was for the Citizens National Forest Coalition which had formed on the spot), papers which were distributed the next morning at the symposium.

Among the many moments I recall from the symposium one stands out as providing a concise image of the situation: at a cocktail party hosted by Dow Chemical, a Dow lawyer, drink in hand (and wearing what, I assumed, was at least an Armani suit and Italian leather shoes), was candidly telling a small group of us, “Of course we know it kills people, but do you know how many millions of dollars are involved here?”

These many years later, it still seems to me remarkable that the strong environmental principles voiced in the papers that emerged from the Crystal City meeting really did represent both consensus opinions and informed consent of the toxics activists on whose behalf they were drafted, xeroxed or mimeographed, and released; principles in large part found by simple deduction from the facts: 1) That some pollutants (carcinogens being the most infamous) can kill in even the lowest doses, 2) That we have a right not to be poisoned by someone else’s actions; and 3) Therefore, no level of exposure is acceptable. Principles which I later found embodied in *Our Common Future* and *Agenda 21*, and which I came to think of as the “Four-Double-Ps”: *Public Participation*, *Pollution Prevention*, *Polluter Pays*, and the *Precautionary Principle*.

The same principles seem to me to have guided activists from the early days of the movement, through the global ban on dioxin put in force by the 2001 *Stockholm Convention on Persistent Organic Pollutants*, and that continue to guide them in current struggles. I’m proud to have been able to help enunciate them. They underpin and give structural strength to all later environmental protection efforts, backing up the gut feeling that “the bastards have poisoned me already and shouldn’t be allowed to get away with it.”

Starting with Agent Orange, the herbicide issue has been at the heart of toxics activism. Dioxin (tetrachlorodibenzo-*p*-dioxin, TCDD, at that time frequently referred to as “the most toxic chemical known to man”), joined nuclear radiation, as a benchmark nasty for my work on toxics

issues in several industries, ecosystems, countries, habitats and legal paraphernalia. Focusing on right to know provisions (as the central feature of the 4 Ps) in helping to draft the Stockholm Convention over several years with the more than 300 NGOs from around the world, was an exhilarating sometimes exhausting, sometimes frustrating often fulfilling experience.

Seeing how widely the toxics movement had spread, how like-minded civil society was, how consistent its message and goals, and knowing how the movement had begun, I felt that even with the many loopholes inevitable in any international agreement and this one in particular (for example, though there are 200 parties to the Convention, the US still has not ratified it), the Convention represented a real pinnacle in our struggle, a culmination of my personal endeavor, and a fitting time for the resident mule to return to his forty acres.

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tired of the chemical imbalance  
the fossil fuel conglomerates induce  
in air water land and living tissue,  
insinuating their toxic substances  
into every available opening  
farm to pharmacy cradle to grave  
writing the laws and regs that permit them  
to poison the planet and its inhabitants  
piecemeal in the guise of environmental  
protection with only a slap on the wrist  
as each dirty secret is found out  
each compound is taken off the market  
to be replaced with another then found out  
so forth and so on as the glaciers melt  
the world turns into a hazardous waste dump  
while those leading us in the march of progress  
weep all the way to the Chemical Bank

from "This Far"  
*Mr America Drives His Car*



## People. . .Not Poisons (1978)

Michael Gregory, Donna Waters and John Stauber, for Citizens National Forest Coalition, released at the USDA and USDI-BLM "Symposium on the Use of Herbicides in Forestry," Crystal City, Washington DC (21-22 February 1978)

The CNFC is an association of people who live, work and play in our forests, people whose physical and economic well-being depend on the health of these forests. We are people who have seen our crops wither, our animals fall sick, die, miscarry, give birth to deformities. Some of us have personally suffered the brutal effects of herbicidal poisoning, often at the hands of our own government.

We cannot forget that these chemicals were widely used by that government for chemical warfare in the forests and ricefields of Southeast Asia, and are still being used throughout the world on forest, range and croplands, including tens of thousands of acres yearly in the United States.

We cannot forget that dioxin, invariably found in 2,4,5-T and Silvex (2,4,5-TP) and frequently in other phenoxv compounds, is carcinogenic, mutagenic, capable of killing animals and deforming their fetuses at lower levels of exposure than any other manmade chemical ever tested. We cannot forget that dioxin has entered the food chain, that it is being found in beef fat and in mother's milk. We are more than alarmed when we learn from scientific papers that 2,4,5-T, other phenoxies, and PCP, with or without dioxin contamination, are likewise highly toxic, often implicated in cases of cancer, immunological disorders, respiratory, reproductive and behavioral problems, and have been found in the semen and urine of people never directly exposed to the herbicides. While scientific opinion disputes exactly how little of these chemicals it takes to poison animals, ecosystems and human beings, we and the lands we live in, continue to be sprayed. This situation is outrageous and intolerable.

There is no sufficient excuse for the use of these compounds: the medical, psychological and environmental hazards inherent in herbicide use far outweigh any possible financial benefits. Furthermore, herbicidal management, like other energy-intensive methods, becomes continually more expensive, especially when compared to management by biocontrols and labor-intensive alternatives.

Organizations of workers highly motivated by concern for the well-being of the forests in which they work not only show us that there are viable fiscal and environmental alternatives to chemical treatment, but have demonstrated the means to convert our present management to more benign practices without economic catastrophe. And, in fact, by creating thousands of new jobs in some of our country's highest areas of unemployment. Detailed studies by these workers groups, some of whom are CNFC members, point the way to an intensive forest management which takes into full account the broad socio-economic and biogeophysical interrelationships commonly ignored in present management systems which, despite the directives of the *National Forest Management Act* of 1976, are often narrowly conceived in terms of timber and range production.

With these considerations in mind, the Citizens National Forest Coalition calls for the following actions by private and governmental agencies:

1. A total ban on the use of any compound containing or producing TCDD or similarly toxic dioxins.

2. Public access to all data and studies presented by registrants to the EPA in support of registration of any pesticide, and funding of citizen participation at all stages of registration procedure.
3. In depth epidemiological studies in the field to determine the extent of human exposure to herbicidal toxins.
4. Federal funding of the private sector to develop and implement labor-intensive management programs through the training of highly-skilled forest work crews.

## News from the Phenoxy Front (1978)

Michael Gregory, *Huachuca Audubon Trogon News* (Winter, 1978)

In late April, the US Forest Service began operating under a new policy regarding pesticides. This policy is set forth in a set of memos and directives issued by M. Rupert Cutler, Assistant Secretary of Agriculture for Conservation, Research and Education, and Forest Service Chief, John McGuire.

USDA policy henceforth (or at least for the one-year period McGuire's Interim Directive #1 covers) is to use pesticides of any kind only as a last resort. Forest managers are enjoined to make a thorough and realistic search for and analysis of alternatives to toxic sprays. Manual methods are specifically encouraged.

Furthermore, "The herbicides 2,4,5-T, Silvex, or other materials containing TCDD may be used *only* where no other environmentally acceptable and economically feasible alternative, nonchemical or chemical, is registered or available. Cost-effectiveness will not be the sole criterion. When decision is made to use these pesticides, the Assistant Secretary for Conservation, Research and Education shall be provided the opportunity to review the decision prior to implementation."

In effect, this action from Washington should close down most federal use of dioxin-containing chemicals, not by direct ban but by the increase in red tape their use now entails.

Other provisions of the new policy require that no pesticides shall be used in wilderness areas or where endangered or threatened species and habitat may be adversely affected. Areas to be sprayed must be posted before and after the spraying to ensure that the public knows what pesticide is being used, when and where. Environmental monitoring will accompany each use, and the results will be fed into the EPA review of dioxin. "Aerial application methods shall be used only when advantages over ground methods are significant."

Just how significant this policy change will be can only be judged by its local effects. In northern California and Oregon thousands of acres began to be sprayed with 2,4,5-T in May—supposedly with approval of Cutler's office. Public disapproval is again leading to court injunctions and local ordinances. For instance, the Trinity Co., California Board of Supervisors has been requiring a permit for spraying any phenoxyes; the safety requirements connected with the permit are so stringent that phenoxy use in that area has been effectively halted.

In Washington State the Dept. of Highways has begun a program of mowing and chipping roadside brush and weeds rather than spraying. In Idaho and the Pacific Northwest the Forest Service has let out a number of contracts for manual control of brush.

All of this is obviously a step in the right direction, but in many areas (notably Arizona, New Mexico and Arkansas) the new policy has meant simply a change from 2,4,5-T to the less "controversial" 2,4-D. Recent tests indicate that 2,4-D, though less toxic than its dioxin-contaminated relative, is still carcinogenic and mutagenic. Lawsuits and legal moratoriums on 2,4-D in Arkansas, Minnesota, British Columbia and California show that the switch to this widely-used agricultural chemical is the prelude to another round of battles.

The intent of the Washington directives seems clear enough. Why so much resistance at local levels? One answer is suggested in the closing words of a letter I recently received from the Chairman of the USFS Region 3 Pesticide-Use Coordinating Committee. After relating the

decision of the Prescott NF Supervisor to switch from 2,4,5-T to less “controversial” methods of vegetation control on a small electronics site, the author explains “that the Forest Service will continue to use registered herbicides whenever necessary to accomplish our land management objectives. . . . Pesticides will be used when it is clearly demonstrated that the use is essential to meet management goals.”

This attitude is in accord with the Cutler/McGuire directives, but like them misses the main point. What we need, instead of piecemeal substitutions of one chemical for another is a clear changer in forest management goals. The Secretary’s decision to seek environmentally-sound management methods must be accompanied by a decision to manage in ways that keep the health of the forest of first importance and short-range economics second. Until such concern for the forest itself is felt at the local level, all the directives from Washington are so much bureaucratic nonsense.

McGuire and Cutler are to be congratulated, however, for making these first steps. When you write to them, be sure to mention that the switch to 2,4-D is not acceptable and that a moratorium on the use of all phenoxies is needed at least until the results of the EPA reviews are in. The mismanagement of forests in the past (as in the Pacific Northwest) is no excuse for chemical poisoning now.

### ***Further Reading***

Interim Directive No. 1 to USFS Manual Chp. 2140 (27 April 1978).

*The Other Face of 2,4-D* by the South Okanagan Environmental Coalition (Penticton, BC).

Allen, J.R. 1977. Morphological Changes in Monkeys Consuming 1 Diet Containing Low Levels of 2,3,7,8-Tetrachlorodibenzo-*p*-dioxin. *Food and Cosmetic Toxicology* 15:401-410.

US-DHEW. 1968. Deaths from Chlorinated Phenoxyacetic Acids (2,4-D, 2,4,5-T, MCPA). *Clearinghouse for Poison Control Centers Bulletin* (March-April).

Fuller, John G. 1978. *The Poison that Fell from the Sky* (NY: Random House); condensed in *Reader’s Digest* (August 1977).

## **Sue the Bastards (1978)**

Michael Gregory, *Mule Mountain Observer* (Bisbee) vol. 2 (12) (28 December 1978)

In Phoenix recently, I attended an open meeting of the State Board of Pesticide Control. The meeting was one of a series held in response to the protests of Maricopa County residents who had for some months been getting doused with pesticides from crop dusters treating cotton fields near their suburban homes.

The people had complained of nausea, eye problems, rashes, sick babies, and a variety of other symptoms following the sprayings. Despite the fact that the exact types of chemicals, and their mixtures (and, therefore, their synergistic effects) were all somehow mysteriously unknown, a number of experts flown in by the SBPC testified that the problems were not caused by the pesticides. Many agreed with the testimony of one of their professional colleagues that the sickness was caused by the hysteria of the residents, and the strong onion-like odor of one of the chemicals. This same expert testified that the outlawing of DDT a few years ago had nothing to do with matters of public health, but was a purely "political decision."

The scenario would have been merely ludicrous if (1) a number of men dressed in business suits and western-style work outfits had not vigorously applauded the DDT statement; if (2) people's health & lives were not involved; and if (3) it were not all so reminiscent of expert testimony in hundreds of other public hearings on pesticides, nuclear proliferation and other forms of manslaughter we call pollution.

This one particularly reminded me of a number of stories told by Billee Shoecraft in her book *Sue The Bastards!* (Phoenix, Franklin Press, 1971). Ms. Shoecraft, her husband, neighbors and children, their property, homes, crops and livestock, were repeatedly sprayed with herbicides by the US Forest Service. Despite their protests to local and state officials, to public land managers and elected Federal Representatives, the Globe, Arizona, residents were systematically poisoned from 1961 to 1969.

In that year the Globe community gave up on "normal channels." After suffering from a variety of illnesses including partial blindness and visual distortion, nausea, liver damage, "instant" baldness, running sores, etc.; after watching their animals die, go barren or reproduce grotesquely misshapen, short-lived offspring; after being threatened and lied to by public servants, company executives and know-nothing academy-trained professionals; Ms. Shoecraft and friends were finally able to stop the Salt River Project and Tonto National Forest from continuing the brush-to-grass conversion program the "responsible" officials insisted was harmless "to birds, insects fish, wildlife or humans."

Through a long struggle the Globe people were able to prove that the chemicals in question (2,4-D, 2,4,5-T and 2,4,5-TP (Silvex)) were, indeed, harmful—in fact, deadly—to all those beings. The campaign of truth against the lies of Forest Supervisor Robert Courtney and District Ranger Bill Moehn began with a funeral procession from Globe to Phoenix for a teddybear Smokey and his dead plant friends.

Despite a call from Courtney trying to cancel the event, the media people met the caravan and recorded its message. Here are some of Ms. Shoecraft's comments on the funeral:

"The casket was lifted out, the plants taken gently from the big box. These included shriveled, blackened peaches, some with a second growth on their sides; some with four

seeds; orange colored, four sided egg plants, four kinds of peppers grown on a single vine. Some were purple, some black and twisted; others were red and weird green ones. There were blackened roses and rotted orange cactus."

"There was corn from my garden, six inches tall, with tassels, and two inch ears of corn. There was golden bantam corn 9 feet tall, with ears out of the top, and none on the side, and no grains on the ears! Pumpkins that were hollow, and only shells. Shriveled dried apples; okra 7 feet tall with no leaves, and split, twisted growths on the side. One tomato plant 15 feet long with no tomatoes. And that crazy squash, 8 feet long, all turned inside out! Smokey kept his eyes shut and didn't make a sound!"

"If I've taken a little longer than I meant to with this chapter, It's because it's the only way I know to let you...the reader out there, know what prompted our long black hearse in the first place....and that it must not happen again."

"This was the only way we knew to break the strangle hold of suppressing what we had already seen first hand about the effects of phenoxy herbicides."

A few months ago, less than ten years after the Globe sprayings, Billee Shoecraft died of cancer. As her legacy she left us one of the best books I know on the sadistic conspiracy of big money, government and public apathy.

January 15-16, there will be a public "Forum on Pesticide Usage and Safety" held in Tucson. For information and reservations, contact Dick Vandemark, Project PPEP, 338 N. Granada, Tucson, AZ 85705. Have a Happy New Year!

## **Statement on Rangeland Policies (1979).**

Michael Gregory, Donna M. Waters and John C. Stauber, for Citizens National Forest Coalition, released at the USDA/USDI-BLM/ CEQ Symposium on the Rangeland Policies for the Future, Tucson, Arizona (28-31 January 1979).

We appreciate the courtesy and attention with which the other participants in this Symposium on Rangeland Policies for the Future have listened to our suggestions and complaints. We have come to Tucson, like all of you, in a spirit of cooperation and hopefulness that the serious problems that beset our rangelands can be solved to our mutual satisfaction and benefit. We are afraid, though, that as has happened so often in the past, this conference will result only in more words and paper and red tape and perpetuation of the problems.

We all heard yesterday a very small segment of the controversy that surrounds phenoxy herbicides, a controversy which has been with us since the chemicals were first invented a generation ago. Some people say this, some that, the scientists agree to disagree, the bureaucracy muddles on, the ranges continue to deteriorate with the value of the dollar, and people continue to be sprayed—often at taxpayer expense—with chemicals that are known to deform fetuses, cause “spontaneous” abortions, and mutate chromosomes in doses so small that our best technology can just barely measure them.

Monitoring studies have shown that some of these chemicals persist in the soil and in streambeds for years. Recent scientific research has proved that they accumulate in the tissue of plants and animals and in mother’s milk. Other research shows that many of these chemicals break down under natural conditions to form compounds that are often more toxic than the herbicides themselves—and these breakdown products are seldom if ever looked for in people or in the environment.

We are also concerned because no one involved with the dissemination of these toxins seems to be studying or even asking about the health effects these chemicals produce in combination with each other and with other pollutants. What few studies have been done show that at least some of these chemicals combine to become more poisonous than either compound.

The scientists may politely argue with one another forever about how many parts per trillion of which chemical it takes to kill so much of what organism, but the time is past when we can afford to quibble over the fine distinctions of science such as whether or not no-effect levels are even theoretically possible for toxics that bioaccumulate past the toxic level.

We do not know what effect these chemicals are already having, for no medical reporting system is in effect that can give us that information. We do know that phenoxy herbicide residues are already in the food chain, in beef fat, in mothers’ milk, in fish, in shrimp.

The scientists and the industry and the administrators talk in terms of acceptable risk, but there is no acceptable risk for those of us who are—against our will—being subjected to these highly poisonous chemicals. You may treat your private property as you will. That is one of your basic freedoms guaranteed by the Constitution. But nothing gives anyone the right to poison another’s person, property, air, nor to contaminate public lands and waters and wild animals. You may expose your livestock to toxic substances if you will, but at some point the public’s health must be protected if those animals are marketed.

We have heard much in the past few days of integrated range management and improving range

conditions. We concur with you in believing that a broad cooperative effort is necessary to attain and sustain a high productivity on our rangelands, and we are glad to help achieve that goal in any way that is truly constructive in the long run.

Treatment of land and air and water with phenoxy herbicides is not the answer. They are part of the short-sighted cosmetic solutions supplied by the chemical industry and the government such as have long plagued the management of our public lands.. Proponents of the chemical habit like to tell us that these poisons are not dangerous if used properly. But we have seen our friends and animals suffer, and have suffered ourselves the ugly realities of phenoxy poisoning. The vested interests tell us that they have seen to documented evidence of abortions, birth defects and cancer from these chemicals. We cannot say whether these people are lying or if they have somehow missed studies. Certainly some of the studies are hard to obtain. We have taken time to search out these facts and will be glad to share with you the documentation for any statements we have made.

The scientists and government agents do nothing so well as procrastinate. Only private individuals can act quickly enough to stop this foolish mismanagement. We invite you to write us. We ask only that you send a self-addressed, stamped envelope and read the information you receive.

### **Some Facts from the Literature on TCDD and Phenoxy Herbicides: a Brief Selection**

#### ***Birth Defects***

2,4-D; 2,4,5-T; and TCDD all cause birth defects, alone or in combination: Verrett, *USDHEW Natl Center for Toxicol Res Draft Rep* (Sep 1975).

2,4-D & 2,4,5-T teratogenic & fetotoxic: *Bionetics Res Lab Contracts Ph-43-67-735*, PH 43-64-57 (1975) and unpubl. Vol. III of same report.

1ppt TCDD administered on days 6-15 of gestation resulted in 5% test fetuses with cleft palate. 3ppb caused cleft palate in 71% (0% in controls): Smith et al *Toxicol Appl Pharmacol* 38: 517-523 (1976).

10-100 ppt TCDD clearly affect reproductive capability of rats over 3 generations: Dow Chemical Co., unpubl. paper (1971).

#### ***Mutation and Cancer***

2,4-D causes cancer & mutagenesis: Mrak, ed, *Report of the Secretary's Commission on Pesticides*, USDHEW, pp. 474, 639 (1969).

2,4-D causes chromosome damage: Yoder et al, *Mutation Res* 21:335-340 (1973).

2,4,5-T mutagenic: Dragnes & Helgeland, *Acta Pharmacol Toxicol* 36(2):103-112

5ppt TCDD result in cancer 50% rats: Van Miller *Chemosphere* (in press).

#### ***Neurotoxicology***

MCPA & 2,4-D bio-accumulate in brain & cerebro-spinal fluid: Elo & Ylitall, *Acta Pharmacol Toxicol* 41(3):280-284 (1977).

2,4-D causes DNA damage in humans: Ahmed et al, *Mutation Res* 42(2):161-174 (1977)

TCDD causes idiopathic neuropathy: Pocchiari, *Human Health Effects from Accidental Releases of TCDD at Seveso* (Rome: Inst. Super. di Sanita, 1978).

2,4-D interferes with cerebral electrical activity: Desi, *Arch Environ Health* 4:95-101.

PCP & 2,4-D causes peripheral neuropathy: McCloud, *Austral New Zeal J Med* 3: 268-269.

### **Public Health**

2,4-D in low doses inhibit marine microbial predation on E. coli bacteria; high doses stimulate predation: Walsh, *Nature* 249(5458); 673-674.(1974).

500ppt TCDD disrupts immuno-suppressive system of rhesus monkeys: Allen et al, *Food Cosmet Toxicol* (in press).

### **Milk**

2,4-D & 2,4,5-T molecules have special affinity for cow's milk: Kolberg, *Acta Pharmacol Toxicol* 33:470-475.(1973).

### **Livestock**

2,4-D & 2,4,5-T result in reduced growth rates in chickens: Whitehead, *Toxicol Appl Pharmacol* 21(3): 348-354 (1972).

Animal use of phenoxy spray areas lessened: Arizona Fish & Game WP4J8:81-87 (1974).

2,4-D spray area keeps sage grouse out: Wallestad, Mont Dept Fish & Game (1975).

### **Beef Fat**

TCDD accumulates in beef fat to at least 60ppt: USFS REG 6 EIS, *Vegetation Management with Herbicides* (1978).

Cattle take up TCDD in fat, 20-60ppt: US-EPA *Dioxin Position Document* (1977).

### **Fish & Wildlife**

TCDD accumulates in wildlife from 2,4,5-T spray area up to 136ppt: Costle, USFS Reg 6 EIS, *Vegetation Management with Herbicides* (1978), H82-H88.

600 reindeer killed eating conifer needles sprayed with 2,4-D & 2,4,5-T: Lundholm, *Nature* (1970).

2,4-D results in embryotoxicity & fertility disruption in birds: *Comptes Rendus Ser d* 271(25):2418-2421.

### ***Pest Increases***

2,4-D causes increase in corn leaf aphids & smut: Oka & Pimentel, *Environ Entomol* 3(6): 911-915 (1974).

2,4-D causes increase in corn borers, smut, blight, aphids: Oka & Pimentel, *Science* 193: 239-240 (1976).

2,4-D metabolized to 2,5-D in grasshoppers, inhibits predator preference: Eisner et al, *Science* (April, 1971): 277-278.

### ***Spray Drift***

20-75% sprays do not reach ground in target area: Natl. Res. Council of Canada, NRCC REP 16075, Sect 2 (1978).

### ***Fate***

2,4-D disturbs soil microbiology: Breazeale, *Appl Microbiol* 19(2):379-380 (1970).

PCP found in 100% young males tested in Florida; in semen & urine: Dougherty & Piotrowska, *US Natl Acad Sci Proc* 73(6): 1777-1781.

TCDD in fish & stream silt 4 years after spraying: Bartleson et al, US AF, AFAT-TR-75-49 (1975).

2,4-D in market fats & oils (0.001 mg/kg), in sugars (0.004 mg/kg): Duggan Weatherwax, *Science* 157:1006 (1967).

Plants sprayed with 2,4,5-T produce high amounts of dioxin when burned: Stehl & Lamparski, *Science* 197: 1008-1009 (1977).

### ***Synergistic Effects***

2,4-D increases toxicity of DDT & Organophosphates: Lichtenstein et al, *Science* 181: 847-849.

Carbaryl increases toxicity to trout of 2,4-D, Dieldrin, etc.: Statham & Lech, *Toxicol Appl Pharmacol* 36: 281-296 (1976).

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## **A Selected List of Herbicide Poisoning Incidents**

**Globe, Arizona - 1969.** USDA and Salt River Project sprayed Agent Orange and related phenoxy compounds on watersheds in the Tonto National Forest to convert chaparral to grass. Local residents were poisoned by direct spraying and by ingestion of contaminated food and water. Billee Shoecraft, one of the residents, died of cancer January 7, 1977; at least 19 others have died as a direct result [*alleged*—ed., 2016] of the sprays. Complaints included uterine bleeding, miscarriages, chest pains, eye irritation, nausea, diarrhea, rashes, partial paralysis, headaches, tumors, lymphocytosis and a long list of chronic ailments that have developed over the years. Also reported were deformed guinea pigs, goats and ducks, dead fish, wildlife, infertile eggs and fowl milk.

***Socorro, New Mexico -1971.*** Ranchers filed suit claiming loss of 38 to 100 cattle, 40% aborted calves; the rest of their stock was quarantined by USDA for illegal amounts of Silvex residues. Sprayed cattle slobbered, became paralyzed in their hindquarters and died. Autopsy revealed degenerated interior organs. Calves were born deformed or were stillborn. One rancher, Lewis Trotter, and his daughter claimed to have been directly sprayed by Bureau of Reclamation.

***Pittsville, Wisconsin -1971.*** 2,4-D and 2,4,5-T drifted onto Harold and Nettie Freedlund's 310 acre farm. Mrs. Freedlund subsequently suffered two miscarriages and the family complained of stomachaches, headaches, fevers, nausea, sleeplessness, boils and rashes. Kittens, puppies, a pig, a calf and chicks were born deformed. Eggs wouldn't hatch, milk became bitter, pigs lost weight drastically in a few days, and a cow died of leukemia with 80ppb 2,4,5-T and a trace of Silvex in its blood. Dwarf skunks and dead snakes and deer were reported. Six women living nearby suffered spontaneous abortions.

***Miranda, California - 1975.*** 2,4-D and 2,4,5-T sprayed by Barnum Lumber Company drifted onto the homesites of Calvin Hathenbrook and Art and Helen Holmgren. The Holmgren's fish died and their cow aborted. Mrs. Holmgren developed cancer. Hathenbrook claimed headaches, rash, sleeplessness and temporary paralysis. His horse and dogs were sickened and kittens were born deformed.

***Five Rivers, Oregon - 1975.*** Following use of phenoxy herbicides by the USFS, residents claimed over \$20,000 loss of crops and livestock. During the resultant suit to ban spraying on the Siuslaw NF it was revealed that residents had suffered miscarriages, untimely bleeding, severe headaches, eye irritation, chest pains, bloody noses, diarrhea, and acne as a result of the spraying.

***Missouri - 1971.*** A horse arena in eastern Missouri was treated with used motor oil contaminated with 2,4,5-trichlorophenol (TCP) and TCDD. For the next 3 years horses, birds, cats and dogs in contact with the arena suffered gastrointestinal and urinary difficulties, edema, conjunctivitis, weight loss, alopecia, skin diseases. foot and joint disorders, polydipsia, anorexia, abortion and death. Children exposed to the contaminated soil suffered polyneuropathy, headache, bladder inflammation, skin lesions, polyarthralgia and rashes.

***Centralia, Washington - 1975.*** Mandatory spraying of 2,4-D and 2,4,5-T required by USDA for control of tansy ragwort at the Straussberger horse ranch led to the decimation of a herd of fine breeding stock. Over 90 animals were lost, with symptoms preliminary to death including emaciation, weakened hindquarters and hair loss.

***Seveso, Italy - 1976.*** A chemical company accident released 1-15 pounds of TCDD into the atmosphere, resulting in massive loss of small birds and animals and an epidemic of chloracne, spontaneous abortions and blood ailments. Between January and June, 1977, 8 children were reported born with serious birth defects, including genital deformation and badly malformed intestinal systems. Among other effects, idiopathic neuropathy has been documented.

***Roseburg, Oregon - 1978.*** 17 ewes bred on a pasture sprayed with Weedone (2,4-D + 2,4,5-T) gave birth to 11 dead or deformed lambs. Deformities included bulging eyes on foreheads, missing upper palates, jaws that curled up over deformed or absent nostrils. 59 ewes that had not grazed the sprayed pasture produced normal lambs.

## Herbicides on Rangelands (1979)

Michael Gregory, *Mule Mountain Observer* (February 1979)

The Symposium on Rangeland Policies for the Future held in Tucson January 28-31 was a fine example of Carter-style participatory democracy. The symposium was sponsored by the US Departments of Agriculture and Interior and the President's Council on Environmental Quality in connection with upcoming revision of federal rangeland policies. High-ranking officials of affected agencies were there to speak and listen and answer questions concerning the badly deteriorated condition of our public and private ranges.

On the third morning of the symposium, after many participants had already departed and the agenda called only for an official wrap-up and a few of the sponsor's projections about the future, a hand count was taken. Of the 400 or so left in the Marriott Hotel ballroom, by far the majority were government employees, including university and agency scientists.

The next largest group, maybe a third of the total, classified themselves as rangeland "users", a jargon term commonly applied to ranchers holding grazing permits on public lands. Had the count been taken a day earlier, this contingent probably would have matched the government in size as it certainly did in vigor.

It was not what you would call a "public meeting." The tiny remainder of the audience consisted of, in descending numbers, rangeland owners without government permits, industry suppliers, conservation, public interest and consumer groups, and unaffiliated individuals.

Few if any fell into this last category due to the make-up of the invitation list and lack of prior publicity, due to the \$20 registration fee and exorbitant prices for bad meals on top of travel expenses, and due to the general lack of knowledge among the public about rangeland issues. The meeting was clearly designed to be a confab between government and the livestock industry, modified by the relatively unusual inclusion of on each speakers panel of an "environmentalist"—which means, in this context, a representative of a major conservationist organization. A certain sense of self-congratulatory elitism circulated among the crowd at coffeekbreaks and cocktail hours.

About 70% of US land is considered rangeland, most of it, and the best of it, privately owned. It was not unusual to meet people at the symposium who held deeded title to many thousands of acres of rangeland, a resource the federal budget office calls "residual". The livestock industry prefers to have it thought of as a "food production resource."

Although recent government calculations suggest an upward trend, for the past century or so our ranges have been, as they are now, in deteriorating condition, over 75% of them producing livestock, wildlife and forage at less than 50% potential. Most conferees seemed to agree that the deterioration was the result of past overgrazing and mismanagement.

The focus of the conference was on increasing output. Suggested methods of correcting the situation ran the gamut from federal financial and technical assistance to complete government withdrawal; from full-bore chemical meat production to total domestic stock exclusion, while the government scientists plugged away all the while for equality in multiple-use production of livestock, wildlife firewood, mining, recreation, wilderness and water.

One member of the panel on Ramifications of Vegetation Modification, Maureen Hinkle of the

Environmental Defense Fund, addressed the subject of phenoxy herbicide contamination of the environment. In deference to the pre-symposium admonition of moderator Fred Tschirley that his panel was not to become a vehicle for “polemics on 2,4,5-T,” Ms Hinkle chose not to enumerate the well-known health problems associated with phenoxy use, but instead quietly reported the results of a number of studies showing that 2,4-D, 2,4,5-T and 2,4,5-TP (Slvex) and related compounds are widespread in the environment and, despite chemical industry reports to the contrary, do persist for years in soils and waters and animals in direct proportion to the amounts sprayed.

One study she cited found up to 230 parts per trillion (ppt) of dioxin (TCDD), the highly lethal byproduct of some phenoxy herbicides, in catfish downstream from the Dow Chemical herbicide plant in Midland, Michigan. Further downriver at Saginaw Bay the fish contained as much as 24 ppt, and the amounts did not decrease significantly during the two-year study.

Dow’s own studies indicate that 1-100 ppt TCDD affect the reproductive capacity of rats over a period of several generations, and other studies show that as little as 1 ppt (the smallest amount our best technology can measure) will produce cleft palates in fetal mice; that 5 ppt have produced cancer in 50% of rhesus monkeys and result in death.

Nearly 1,000,000 pounds of phenoxy herbicides were sprayed on US range last year in an effort to convert brushlands to grass forage, and supposedly to improve big game habitat, water flow, scenic qualities, etc. Cattle eating the soil and plants of ranges sprayed with 2,4,5-T and 2,4-D accumulate phenoxy residues, including TCDD, just as the fish do that live in runoff waters, or deer who may absorb the chemicals just from walking through sprayed fields. As much as 60 ppt TCDD has been found in beef raised on sprayed pastures and as much as 136 ppt in wildlife.

Although the phenoxies are used on only a small percentage of rangelands, their residues are found throughout the waters and wildlife of the continent, transported from the crop-, forest-, and rangelands where chemical management is practiced. They bio-accumulate in fatty tissue and have entered the food chain; they are found in human semen and mother’s milk. There is no no-effect level for them since they bio-accumulate and bio-concentrate and, by process of synergism among themselves and in combination with other pollutants, they bio-magnify in toxicity.

Given the known facts about phenoxy poisoning and the recent professional discrediting of the Council for Agricultural Science and Technology (CAST) whose reports on the safety of phenoxies have been widely influential, it is difficult to understand why rangeland managers insist on using the chemicals.

Economics are the reason usually given, but use of expensive herbicides may be highly unprofitable in a time of rising petrochemical costs, even without figuring in the medical and legal consequences of public and occupational contamination. Chronic depression is the norm in ranching finance and, as pointed out in a recent paper by Friends of the Earth and the Sierra Club, at least in west Texas (the state where most 2,4,5-T is used on rangeland), the profit margin from cattle production is so slight that use of expensive phenoxy herbicides is fiscally feasible only with the aid of federal subsidies of up to 50%.

Grazing on public land is almost always a seasonal affair. In a typical operation cattle are let out on public range to calve and fatten until fall roundup. Then the herd is thinned by sale and slaughter of all but the breeding stock which is overwintered on private land. By this process young calves which have been fed until marketable age free-of-charge on public land are sold at the rate of several hundred pounds of red meat per head. The business would seem to be highly

profitable. But ranchers insist they are an endangered species threatened by economic injustice, and the financial condition of the industry, like the ecological condition of the rangelands, does seem to be deteriorating.

Figures presented to the symposium by James Gray of the University of New Mexico Department of Agricultural Economics and Agricultural Business indicate that a typical New Mexico rancher may have as much as \$5000 per animal unit month invested in his stock and be in debt from \$50-\$200,000. Faced with the inability to make a profit from simply raising cattle, the modern rancher in order to survive has switched from the livestock business to the business of buying and selling ranches and rangelands.

If, as Dr. Gray's remarks suggest, the livestock business is really only a front for land deals, the inconsiderate abuse of rangelands by chemical and factory methods of production are not so hard to explain. If the American ranchstyle/western-movie way of life there's so much talk of saving is in actuality the mafioso-style of real estate speculation devoid alike of the art of animal husbandry and of pastoral ethic, we need not feel so much sentiment about preserving it.

If, in fact, the livestock producers do not clean up their act in regard to public health, consumers may well be forced in self defense to organize beef boycotts and initiate legal actions as they have against other pollution industries. Using EPA registration as an excuse for poisoning the environment never was morally viable, and recent court decisions have shown that it has no legal validity either. The responsibility for consequences lies with the user, who, whatever rights he may have regarding practices on his own land and animals, has no right to poison another's property or person, nor to contaminate public lands, air, water and wild animals. And if livestock exposed to toxic substances is brought to market, the public's health must likewise be protected.

As other panel discussions at the symposium reiterated, court actions satisfy no one and are best avoided. Hopefully the industry and government will act quickly to stop the dissemination of toxic substances on our rangelands as on all of the rest of our lands. The lack of concern for public health issues at the symposium makes such corrective action unlikely, however; most probably the scientists will continue to agree to disagree, the government will inch along, the chemical companies will yet prosper, and people will keep getting sprayed against their will.

There are some alternatives. EPA has put out calls for pro-con statements on risks and benefits of a number of the chlorophenols—including 2,4,5-T, 2,4,5-TP (Silvex), and PCP (Penta wood preservatives). The final decision on whether or not to ban 2,4,5-T by lifting its registration is due out in April. The EPA has received thousands of comments on the review process, and concerned people are continuing to send information and opinions to administrator Doug Costle in an attempt to balance the heavy industry lobby before deadline.

Some feel that the EPA, like the USDA, is too industry-ridden to rely on. A recent draft assessment on 2,4,5-T by those two agencies may justify such a view. One person dissatisfied with EPA is Senator Gaylord Nelson who, for the sixth time last August, introduced to Congress an amendment to the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) that would ban all use of 2,4,5-T and other TCDD-containing pesticides. A growing number of letters are being sent to Nelson and other Congresspeople calling for reintroduction and passage of the bill.

Pressure on health officials around the country and in Canada is winning more and more local and regional bans, but in recognition of the shortcomings of special item legislation, judicial review, NEPA process, and the difficulty of changing peoples' attitudes, many letters from unexpected quarters are also going to Congress lately in opposition to the passage of a gun control Act.

## **A Four-Point Primer on Pollution Prevention (980)**

Michael Gregory, *Bisbee Mountain Journal* (4 September 1980), p.8.

Item One about most pollutants is that they haven't been studied enough for us to know just how poisonous they are. Not that this fact prevents polluting industries from subjecting us to their effects; just the opposite. The industrial rule of thumb seems to be, "Get out as much as you can as quick as you can, before they find out what it does and make you pay for it.

The Environmental Protection Agency is currently promulgating regulations to implement the *Toxic Substances Control Act* (TSCA) of 1976 and a number of other enlightened laws of the 70s that were designed to ensure adequate testing of hazardous substances before their deliberate exposure in the marketplace or inadvertent release into the biosphere.

There is a curious dynamic at play between businesses and regulatory agencies: despite such regulations, to some extent because of them, our industrial dinosaurs and science fiction monsters by and large continue to inject known and unknown poisons into our bodies via our homes and workplaces, our food and water and air and general electromagnetic environment.

When regulations do finally get written (often as much as ten years after the law was passed, and only after lawsuits by conservationist groups), they tend to be either poorly written or poorly enforced—the effect in either instance being that business, especially big business, goes on as usual.

The EPA's recent ruling on 2,4-D is typical of poorly written regulations. In view of numerous adverse medical reports on animal experiments with 2,4-D, the EPA's Federal Register notice requires Dow and other manufacturers to produce studies showing that the chemical is "safe for humans and the environment," especially in regard to carcinogenic and sexual effects.

Asking manufacturers to prove the safety is a novel departure from the usual scenario in which the exposed public is required to prove that the product is not safe. Be that as it may, in the same notice the agency decided to disregard the evidence of animal tests—some of them run by the government's own Public Health Service and Food and Drug Administration—and consequently, citing a lack of evidence, refuses to take the chemical off the market as an imminent health hazard. Catch 22. As with 2,4,5-T, the EPA chooses to delay action until after the fact of human damage, and at the expense of prolonging human exposure.

EPA's Advisory Opinion on cotton pesticides issued in July is typical of agency rulings that beg for enforcement. The Opinion (which in some respects has the authority of law) results from hearings last September on the Scottsdale pesticide problem. In the interest of public safety, the agency advises states to make a few modest changes in current cotton spraying practices—establishing quarter-mile no-spray buffer strips and 24-hour prior cut-off near schools, notifying inhabitants ahead of time, etc.

The overwhelming testimony at the September hearings, including that of Governor Babbitt, pronounced the Arizona State Board of Pesticide Control incompetent to enforce pesticide regulations in the state and highly unlikely to develop policies and regulations that favor public health over the greed of petrochemical agribusiness. Speaker after speaker at the hearings requested that EPA not grant primary enforcement powers to the state even when it was known that the federal enforcement division is also understaffed and under-funded.

An ounce of prevention being worth so much, Item Two about pollution (and a major tenet of

modern medical science) advises caution as the proper course when our understanding of conditions is unclear and incomplete. Unfortunately, medical prudence seldom has as much sway with regulatory agencies as medical jurisprudence. The EPA is under compulsion to weigh all matters of public health and safety against the pecuniary welfare of polluting industries. This results in the so-called risk/benefit analysis, a way of setting a price on your life by financial statistics, of deciding who and how many are expendable in the name of free enterprise, of making us all part of the experiment.

The draft “Advisory Opinion Concerning the Application of Cotton Insecticides and Defoliants” is up front about this, admitting that pesticides do drift off target even under the best spray conditions; admitting that exposure of adjacent populations does occur regularly and that complaints of people living near cotton fields are quite probably justifiable; admitting that epidemiological monitoring ought to be done in the area to document health problems; but insisting, as with 2,4-D, that our nearly total lack of scientific knowledge about the human effects of these economic poisons is insufficient cause to prohibit sales and applications at least until proper tests have been done. Business as usual: the chemicals and their parent companies implicitly declared innocent until proved guilty, while the profits of the polluters create endless delays in the courts and administrative offices and the spraying goes on.

Item Three about pollution regulation is that some industries seem to be immune. For instance, EPA and the Arizona Department of Health Services have both recently written regulations governing the disposal of hazardous wastes in compliance with the *Resource Conservation and Recovery Act* (RCRA) of 1978. RCRA was supposed to prevent the Love Canals and Hanford, Washingtons of the future, and provide impetus for the clean-up and guarded storage of all the many by-products of our technology known to be toxic, or explosive, or radioactive, or otherwise hazardous. One of the more serious hazardous waste problems in western states, however, the problem of mining wastes, receives scant mention in the new EPA rules, and is specifically exempted from consideration in the proposed Arizona regulations. The subject of radioactive waste disposal is deferred for future attention by both agencies. Business as usual.

Item Four is that individual people do make a difference. Laws and regulations and policies are made by people who can be talked to, argued with, put out of office if need be. If you have an opinion, write your representatives and let them know what it is. Call or write the agency and tell them what you think. A handful of people with their heads on right c turn a government agency around, help them see that our health is more important than corporate profits.

## **Dioxin in the Milk (1989)**

Michael Gregory, *Bisbee Daily Review/Sierra Vista Herald* (17 Sept 89)

Thank you for Joe Hinton's article on the plight of Billy Ogas and August DeWig. Their stories are typical of thousands of Vietnam veterans who have waited in vain for the government to compensate them for the Agent Orange exposure they suffered while on duty in southeast Asia. In many ways, their experience echoes the experiences of thousands of other pesticide victims.

The defoliant Agent Orange was composed of two phenoxy herbicides, 2,4,5-T and 2,4-D, the first of which was found in the late 60's to be unavoidably contaminated during manufacture with tetra-chloro dioxin (2,3,7,8-tetrachloro-dibenzo-*p*-dioxin, or TCDD), the most deadly of several kinds of dioxins. TCDD is the dioxin. It has been called the most deadly of all manmade chemicals; it is carcinogenic and causes birth defects.

When the health effects of Agent Orange became widely known, the government stopped using it in Vietnam. Thousands of barrels held by the Department of Defense were transferred to the US Forest Service, which started using it on National Forests. One of the earliest domestic uses was a brush-clearing project on the Tonto National Forest near Globe, Arizona. The spraying was supposed to increase water yield for the Salt River Project and was eventually stopped due to citizen protests.

2,4,5-T can cause cancer even when it isn't contaminated with dioxin, but it continued to be widely used on forests and range lands until 1985, when, after several previous attempts thwarted by the agri-chemical industry, the EPA was finally able to ban its use in this country.

Studies have shown that 2,4-D is also carcinogenic. Recent reports by the National Cancer Institute have shown that farmers in areas of high 2,4-D use have higher than normal rates of non-Hodgkin's lymphoma, the same kind of cancer that killed Agent Orange vet DeWig. Nonetheless, state and federal agriculture departments continue to promote 2,4-D use, especially on forests and crop lands, and the EPA continues to allow residues of the herbicide in our food. 2,4-D is widely available to consumers in nurseries and garden shops.

Last week, the Food and Drug Administration announced that dioxin has been leaching from paper cartons into the nation's milk. The probable source of the contamination is PCP, or pentachlorophenol, a close relative of TCDD. PCP is best known as the wood preservative Penta, and is used in the manufacture of many paper and wood products.

In making its announcement, FDA stated that it would not ban use of PCP in food containers, or order contaminated cartons off the market, but would make it easier on the industry by allowing milk companies to switch to non-contaminated papers voluntarily and to continue use of contaminated cartons until the new processes were in place.

The FDA's reasoning in allowing continued sale of contaminated milk was that dioxin levels were only one or two parts per trillion (ppt), so very few people would be likely to get cancer from exposure to the milk before all the companies have switched to non-contaminated paper. Dioxin has been shown to cause birth defects in laboratory animals (rhesus monkeys) in doses as low as 5 ppt, and it only takes one molecule of a carcinogen in the wrong place at the wrong time to cause cancer.

The milk industry has known of the dioxin problem for many years, and the companies with a sense of social responsibility switched to non-contaminated packaging long ago. The Federal Food, Drug and Cosmetic Act says that no carcinogens shall be allowed in our food. Rather than deciding that a few cancers are ok, the FDA should obey the law it is supposed to administer, by taking all dioxin-contaminated milk off the market and banning use of dioxin-contaminated food packaging immediately.

## **Hazardous Materials in Arizona: Some Contexts for Change (1989)**

Michael Gregory, for the Sierra Club Grand Canyon Chapter, presented to the Verde Valley Citizens against Hazardous Waste, Cottonwood, Arizona (24 August 1989)

Let me start by noting that public, occupational and environmental health are far too important to be left to the scientists, economists, businessmen and bureaucrats. They involve serious legal issues, political issues and quality-of-life issues and raise significant questions about things like civil rights, ethics, and community autonomy.

The public must be deeply involved in decisions about these issues in order to hold up its own interests. Unfortunately, that is not the way it usually works, and the technicians, businessmen and bureaucrats usually are left in a relative vacuum to make decisions that affect all of us. This meeting tonight, and the effect this group has had on decisions-making so far, are exceptions to the rule.

In talking about contexts for change we should probably begin with talking about attitudes. Government and industry have a different attitude about these things than the public does and the public interest is not always best served by the corporate and governmental approach.

One of the biggest problems in Arizona has been the failure of State agencies to act as advocates for public, occupational and environmental health protection. The 1986 *Arizona Environmental Quality Act* (EQA) created the state Department of Environmental Quality (ADEQ) to play that role, but so far the agency has avoided its legislative mandate as public defender.

The traditional State government attitude was exemplified by a State Lands Department official earlier this year who tried to justify lax regulation of mining on State lands by saying that "The industry is our customer."

Even more recently, faced with the fact that only two cities in the state's Active Management Areas have met their modest 1987 goals for groundwater conservation, the Director of the Water Resources Department, rather than enforcing stringent conservation measures, has instead begun "revising the programs. . .to be sensitive to the needs of the regulated community" (*DWR Water Planning News*, Summer 1989) and has asked the public to focus on the accomplishment of the two cities that did meet their goals rather than on the failure of the other cities and the failure of the department.

The government attitude has been accurately described as "growth at any cost," but that outmoded attitude no longer suits the Arizona situation. We have more than enough people, and we have not developed an adequate infrastructure to deal with the population and industry we already have.

It is high time for the government to stop bending over backwards to accommodate every whim of business and to stop spending millions of dollars to encourage industries to come here. The activities of the State Office of Economic Planning and Department of Commerce and other promotional agencies are too often in conflict with missions of the Departments of Health Services (ADHS), and Environmental Quality and other health-oriented agencies.

Too many promises and permits are given out by the State without the prior consent of the individuals and communities who will have to hear the brunt of the consequent developments. Certainly it is time the state stopped promoting growth without getting the approval of the local

communities where the hazmat operations would be located.

Attitudes are embodied in actions and words. Words are a kind of symbolic action which have their own consequences. Let's look for a moment at the language context for hazmat control, keeping in mind that the public interest is almost always broader than any particular technical, economic or political definition, and the language we use should reflect our broad concerns.

Take the term *environment*, for instance; many people forget that the term includes the *human environment*. Environmental protection means protection of human health, as well as the health of the forests, waters, wildlife, etc. The term *environmental health* includes *public* and *occupational health*.

Similarly, the term *hazardous materials* itself must be understood in its broadest sense as including what various laws and regulations call *hazardous chemicals*, *hazardous substances*, *toxic substances*, *hazardous wastes*, *pollutants*, *contaminants*, etc. In that broad sense, the term includes heavy metals, chemicals, explosives, medical wastes, radioactive or otherwise "energetic" materials, genetically-engineered pathogens, etc. Statutory and regulatory language tends not to accept such broad definitions, but, instead, in imitation of scientific terminology, departmentalizes hazardous materials in terms of technical processes or enforcement responsibilities. Scientific language is primarily analytical, a way of learning by dissection and compartmentalization. You get to know something scientifically by breaking it into its smallest components to see what makes it tick.

While the analytic approach is very good for some things (describing natural laws and organizing human endeavor, for instance), it can also lead to fragmentation and narrow focus. We see something like that in state and federal regulation of toxics, where the analytic approach becomes a piecemeal effort driven by lobbyists and crises, rather than by a proactive effort to protect health. There are no unifying state or federal programs for regulating toxic substances in a coordinated, comprehensive fashion.

At the federal level, for instance, we have the *Clean Water Act*, the *Clean Air Act*, the *Hazardous Materials Transportation Act*, the *Occupational Safety and Health Act*, the *Food, Drug and Cosmetic Act*, the *Resource Conservation and Recovery Act*, the *Safe Drinking Water Act*, the *Toxic Substances Control Act*, the *Comprehensive Environmental Response, Compensation and Liability Act*, the *Fungicide, Insecticide and Rodenticide Act*, etc. State laws, in general, are adaptations of federal laws, and implementation of all the laws is spread out among many different agencies.

In Arizona, for instance, regulation of toxic substances is handled by the Departments of Health Services, Environmental Quality, Public Safety Military and Emergency Affairs, Transportation, and Lands; the Offices of the State Chemist and Inspector of Mines; the Commission on Agriculture and Horticulture (which soon to be the Department of Agriculture), the Structural Pest Control Commission (which, hopefully, will soon be part of the Department of Environmental Quality), and the Industrial Commission, to name a few.

Then there is the way hazmats are classified. Usually, they are regulated, if at all, by place of use or occurrence (workplace, highway, water, air, food, waste dumps, etc.). Sometimes they are regulated by class or kind (pesticides, for instance, or radioactive materials). Sometimes, as for instance with radioactive materials). Sometimes, as for instance with infectious materials, by their health effects. Sometimes in other ways.

It is easy for the public to get lost in the complex of rules, jurisdictions and language. One way

to cut through some of the regulatory maze and the amazement is to keep clearly in mind that the goal is to act in the public's best interest. It is almost always in the public interest to broaden the context beyond the narrow focus of government and industry.

The last session of the Arizona Legislature, for instance, talked a lot about hazardous waste. But hazwaste is only one part of the hazmat cycle and not necessarily the best phase to focus on if your objective is to prevent hazmat incidents. Effective control of hazwaste begins at the front end of the cycle, with effective control of production, distribution and use of the raw materials hazwaste comes from.

At present, the state has no comprehensive and effective hazmat management program, and not even an official state definition of *hazardous material*. Different rules, departments and statutes have overlapping and sometimes contradictory definitions. The situation is confusing not only to the general public, but to businesses (who are increasingly plagued with redundant paperwork requirements), and to hazmat managers and regulators themselves. Given this haphazard situation, many hazardous materials escape regulation completely.

As a first step in alleviating some of the confusion and resentment, and at the same time addressing the growing threat to public health, the state should adopt an official definition of *hazardous material*, as soon as possible, and then compile an official State Priority List of the worst 500 materials that fit the definition. Of all the 50,000 or so materials recognized as hazardous, the same 300-500 show up again and again on the various scientific and governmental lists of those materials that are the most toxic, or present the highest risk, are the most explosive, most carcinogenic, or whatever.

Beginning with the lists of acutely hazardous and carcinogenic substances already adopted in the *Environmental Quality Act*, ADEQ should establish a comprehensive hazmat database and coordinate with the other hazmat regulatory agencies to establish the State List. Once the State Priority List is compiled, each hazmat agency should determine which 100 hazmats on the State List are most hazardous or the worst problems in their jurisdictions; and then begin to regulate those 100 in ways that will most effectively and most quickly abate their hazards.

Besides interagency coordination, there are several other points and principles that would have to be part of an effective state hazmat management program: active public participation, for instance; and community planning; strict deadlines for regulation of industries and cleanup of waste dumps; increased monitoring and inspection in all areas of high hazmat use. But I'd like to focus for the moment on what I think of as the basic principle and the basic strategy that should inform a hazmat program.

The basic principle is, we have a right not be poisoned. We especially have the right not to be poisoned for somebody else's benefit, somebody else's profit. The basic strategy is, prevention of exposure.

Some of the materials in the worst-one hundred lists, will be too hazardous to allow in some sensitive environments at all. For instance, substances like dioxin, PCBs, arsenic, aflatoxin, chlordane, etc. should be banned entirely from our food and drinking water. Some cancer or a little cancer or a negligible risk of cancer are not acceptable in those environments. Or at least not acceptable to me. As I said earlier, the question of what is acceptable involves serious questions of civil rights and those questions have to be decided at the community level by every individual.

By definition, one molecule of a carcinogenic substance in the wrong place at the wrong time,

will cause cancer. Other genetic toxins that cause birth defects, sterility, immune-system disorders, etc. are also no-threshold toxins. Some no-threshold hazmats accumulate in body tissue and so the probability of disease is higher at those sites, but one molecule is enough. The only "safe" exposure to a no-threshold toxin is zero.

Prevention is the most effective means of protection. Hazard and risk reduction begin with reductions in manufacture, distribution and use. Regulatory focus has been primarily on remedial actions, cleanups, and hazardous waste. What we need now is lower use levels, less exposure, substitution of less-hazardous materials, required use of "least-toxic" alternatives, etc.

As mortal creatures living in this real world, we have to live with risks. We cannot expect a risk-free existence. It is probably true, as James Watt said, that trees produce dioxins, and I cannot expect the government to protect me from trees. But we should be able to expect our governments to protect us from unnecessary, avoidable risks of manmade hazards added to the unavoidable natural hazards.

For instance, whatever the case with naturally-occurring dioxins, it is certainly true that trees and woods treated with phenoxy herbicides or penta wood preservatives produce dioxins, especially when they are burned. And it is also true that government permits are required for those operations. It seems pretty clear to me that instead of permitting it, the government producing chemicals on trees should prohibit burning of dioxin-contaminated wood products. Similarly, there should be no cancer-causing pesticides or other additives in our foods.

The *Arizona Environmental Quality Act* requires some new facilities to install Best Available Demonstrated Control Technology (BADCT). But if the facility does that, and if it successfully jumps through the other permitting hoops (like meeting application deadlines, paying proper fees, and having some financial means), there is no effective way for the State to stop a facility from starting up. That inability is a legislative bow to the State's economic development program. If a facility violates certain standards once it has started up, the State can react to the point of shutting down the operation and can start remedial actions for any problems caused by the violation.

But sometimes you have to just say "No" at the outset. The bottom line, as accountants say, is the right of individuals and communities to protect themselves. Industry and government like to play with "risk assessment" models, exposure estimates and maximum contaminant levels. But ultimately, it is not even because a question of risk or hazard; if the people of a community do not want a potentially dangerous industry, they should be allowed to keep it out. Zero risk from that facility may be the only acceptable level. The final decision on what is acceptable must be determined at the point of impact by the people being impacted.

In closing, I'd like to point out one danger in telling the State to develop a comprehensive hazmat management plan. We have to be very careful that we do not let the State pre-empt the rights of local communities and individuals to protect themselves. Planning and zoning ordinances can be the most effective tool for community protection. Many communities have passed or all considering hazmat ordinances, and some communities are even considering requiring a local referendum every time a new hazmat facility is proposed.

Especially in the rural counties, we have to be very careful that state and federal laws and regulations preserve the rights of cities, counties, towns, fire districts and school districts to write ordinances and regulations that are more protective than state or federal requirements. Local communities must be allowed to prevent unnecessary and avoidable risks of exposure to their citizens. Rather than restrict or take away local control, the State should fund local communities

to establish and implement local hazardous material management systems. Three areas where most local communities could especially use funding are in planning and zoning, monitoring and inspection, and emergency response. And that may be the bottom line.

## **Hazardous Materials in the Maquila Industry (1989)**

Michael Gregory, for the Border Ecology Project, presented to the United States-Mexico Border Health Association Annual Meeting XLVII, Tucson, Arizona (4 June 1989)

Good morning. I'd like to thank the Association for inviting me to speak today. As someone who has spent a great deal of the last ten years involved with grassroots environmental health issues on the border, I'm glad to know so many health professionals are out there working towards the same ends. It makes me a little more confident that we can be effective in our efforts together.

In the next few minutes, I'd like to give you a little background on the history of the Border Ecology Project and its relation to the *maquiladoras*, and share with you some of the concerns we have about border health issues.

The Project's home base is Naco, Arizona, a small town of a few hundred families scattered in clusters and isolated ranches on the northern side of the line adjacent to the somewhat larger town of Naco, Sonora. About 20 miles to the east are the sister-cities Agua Prieta and Douglas.

Two of the tenets the Border Ecology Project operates by are first, that real improvements in border health conditions have to include not only legal and technological improvements, but social and attitudinal changes as well; and second, that effective implementation of improved plans and procedures require active participation of the local population. It was with those two tenets in mind that the Project became seriously involved with the maquila industry in 1987.

In January of that year Mexico and the United States signed an agreement to control transboundary air pollution sources. For several years the Project had been active in the border air pollution issue and in the negotiations that led to the binational agreement and to the cleaning up the largest industrial source of sulfur dioxide in North America. With the closing of the Douglas copper smelter and state of the art pollution controls being built into the new Naco smelter, our interest turned towards tracking implementation of the accord.

The 1987 smelter accord was put into effect as Annex IV of the US/Mexico Border Environmental Agreement (or *La Paz Agreement*), which had been signed five years earlier by Presidents de la Madrid and Reagan. Annex II to the Border Agreement, dealing with joint response to hazardous material spills within 100 km. on either side of the border had been signed in 1985. In 1986, the Project intervened in the process which led to the third annex, dealing with transboundary transport of hazardous materials, issued in November, 1986. When the air pollution annex was signed two months later, the transport annex was widely perceived as one of the benefits Mexico received in exchange for agreeing to control sulfur dioxide emissions at Naco.

With the signing of those annexes, the Border Ecology Project, like some of the more progressive *maquiladoras*, started looking more closely into hazardous material use and hazardous waste handling. By the end of 1987 the Project was involved a hazmat inventory of the Agua Prieta maquilas.

At the same time we were engaged in another hazmat inventory on the northern side of the border; as members of the Cochise County, Arizona hazardous material emergency planning committee, like some 3000 other local emergency planning committees across the country implementing the new state and federal community right-to-know laws, we were writing our county's first community-based, comprehensive hazardous material emergency response and

recovery plan.

In June, 1988 the Project presented the results of our Agua Prieta inventory to the US/Mexico Working Groups on hazardous waste and the Joint Contingency Team along with a list of recommendations developed jointly with Roberto Sanchez of the Colegio de la Frontera del Norte, who had been carrying out similar studies at the western end of the border.

About 80% of the maquilas cooperated by responding to our request for information. One of the interesting things we learned was that none of the customs officers on either side of the border had any records or recollections of any hazardous wastes coming north. The EPA and SEDUE records didn't show any wastes coming north either. There seemed to be a border-wide absence of tracking. This was made more interesting to us because there were many unconfirmed reports of maquilas dumping their wastes in Mexico, and because Annex III, signed over a year earlier, has a very clear "country of origin" clause that says hazardous waste generated at the maquilas from raw materials brought into Mexico from the US, has to go back to the the US. And in January, 1987 SEDUE had issued a domestic *convenio* to the same effect.

The persistent rumors about spent solvents being dumped down Agua Prieta wells began to seem more significant; and after talking to Customs officials, we also began to wonder how much waste might have been coming back to the US without being recognized, and if that was the case, where was it going once it got here? Since there were no records, the possibility opened up that the wastes might be getting illegally dumped on either side of the border. Or they might have been lumped in with the wastes generated at a company's US facility and treated or disposed through normal RCRA procedures. Due to a peculiarity of Mexican law, some maquilas were known to have "donated" their hazardous wastes to "charities" in the interior of Mexico; we began to wonder if any Agua Prieta maquilas had taken advantage of that outlet. A lot of the wastes, we found, were just piling up, unregulated, in Agua Prieta.

Another interesting thing we discovered was that almost no one in the Agua Prieta/Douglas maquilas knew what the Border Environmental Agreement required of the industry: after a year or more, the top level agreements had not trickled down to the local level. Today, of course, all that is changed: hazmats are a hot topic throughout the industry, and some maquilas have started sending wastes back through proper channels. In Agua Prieta, the first maquila to go through the process was Rogers Corporation, which a few months ago sent back 5500 gallons of residues that had accumulated in Agua Prieta over the past 16 years.

Other maquilas are beginning to enter the process, partly due to growing familiarity with the new right-to-know laws in the US. The concept of right-to-know, which has been implicit in Mexican law for a long time, is revolutionizing the way US facilities do business on both sides of the border. The inventory process that seemed so unusual to maquila managers when we conducted ours a year and a half ago in Agua Prieta is now widely recognized as more or less inevitable.

Three days ago, our local planning committee finalized its hazmat plan and sent it on to the County Supervisors for adoption. The plan is unusual, because it does not confine itself to the US side of the border, but includes hazmat data on maquilas in Agua Prieta and Naco, Sonora. The county plan incorporates and expands on the the Project's earlier inventory with additional data volunteered by some Agua Prieta maquilas in response to the committee's request. There is a long history of transboundary emergency response between the twin cities of (Agua Prieta/Douglas and Naco, Arizona/Naco, Sonora), and the plan also incorporates some of those local agreements. The Cochise County hazmat plan is a kind of home-made working model of the sister-cities plans envisaged by EPA and SEDUE.

One of the recommendations we made to the Working Group on hazmat transport and the Joint Contingency Team last June was that they should combine in order to plan more efficiently. They have been working more closely together, and the Sister Cities Program is the fruit of their combined efforts. The Sister-Cities program, like community right-to-know law, has the potential for solving many of the hazardous materials problems in the maquila industry.

Some of our other recommendations have been improved upon by EPA and SEDUE. For instance, we recommended that the EPA increase direct communication with individual maquilas on both sides of the border to acquaint them with binational rules; EPA has been doing that, and in recognition of SEDUE's limited resources, EPA has also agreed to make on-site case-by-case assessments of compliance at maquilas in Mexico. We also recommended that long-term storage of hazardous wastes in the border area be ended, and the new SEDUE regulations address a major part of that problem. But some of our recommendations haven't yet been implemented, and we think the Sister-Cities Program may be the best opportunity yet to do that.

For one thing, the Sister-Cities Program offers the maquila industry a great opportunity to become responsible corporate members of the communities where they operate. Along with the agriculture and mining industries, the *maquiladoras* are the heaviest hazmat sources in the border region, and the one most often operating in densely populated communities. There are five major aspects of community hazmat planning where the maquila industry can significantly contribute to better public health and safety: (1) Hazard identification, (2) Site specific risk and vulnerability analysis, (3) Training and public education, (4) Hazard abatement or reduction, and (5) Improvement of response capability.

One of the most important recommendations we made last June still hasn't been implemented: cradle-to-grave tracking of hazardous materials in the maquila industry is still not being done. The Sister-Cities Program should help on this too. The site-specific hazmat inventories required for effective emergency planning together with a mass balance accounting between raw material imports and export products will supply necessary data on one crucial phase of the cradle-to-grave cycle.

Another crucial phase in the cycle occurs at the border crossings. We continue to recommend that Customs and Aduana develop mutual forms and procedures for tracking hazardous materials at the border checkpoints. The EPA should supply bilingual training in hazmat recognition and properties for all border officials. US Customs agents should become familiar with and routinely examine Mexican manifests and other shipping papers along with those already required by US import regulations; Aduana should do likewise with imports from the US. The two agencies should openly share information on transboundary hazmat shipments. The data from such a free exchange will provide another crucial link in the cradle-to-grave tracking, will allow a convenient database for mass balance and other calculations, and will be invaluable to emergency planners and responders who have to prepare for hazmat incidents on the highways to and from the maquilas.

The final phase of the hazmat cycle needs to be more carefully tracked too. We still don't know where most of the maquila waste is ending up. Mexico recently announced that it will be licensing recycling plants along the border so that the maquilas can have their recyclable wastes treated closer to the point of generation. Mexico has also explained that the wastes remaining after recycling can lawfully be incinerated in Mexico, and that both those unrecyclable residues and the toxic ash left over after incineration will be considered domestic wastes, not imports, and will not have to be sent back to the US for disposal. Instead, they can be disposed of in Mexican hazardous waste landfills.

There are some serious health-related questions about hazwaste incineration in general, and the whole recycling/ incinerator/ disposal situation with the maquilas needs to be brought under the same tracking requirements as the other parts of the hazmat cycle. Of particular concern is the siting of incinerators and recycling plants; the first licensed operation outside of Tijuana is sited on high bluffs that fall steeply into the Pacific Ocean. I'm not sure how the plant is located in regard to seismic fault lines, but the choice of terrain raises some concerns.

Cradle-to-grave tracking and effective emergency preparedness are two of our main areas of concern about the maquilas. In closing I'd mention just a few more of the areas where we think the maquila industry could make a substantial contribution to public health and safety.

- The primary goal should be hazard and risk reduction inside and outside the plants.
- Training should not be limited to border guards, but should be provided for maquila managers and workers, transporters, police, fire and medical personnel.
- The industry should expand the existing CAER Program (Community Awareness and Emergency Response) of the Chemical Manufacturers Association into an intensive public awareness and education program in the maquila communities.
- Along with taking inventory of their hazardous material use, the maquilas should undertake a program of waste minimization, including substitution where possible of less toxic materials and minimization of waste generation.
- The industry should establish the highest standards for occupational health and safety, including protective clothing, effective ventilation, ergonomically sound procedures and equipment, etc. We agree with Arizona Senator John McCain and Congressman Jim Kolbe who have urged the maquilas to provide workers in Mexico the same level of occupational health and safety protection that they provide workers on the US side of the line, including basic worker right-to-know resources.
- There should be ready access for workers and people in the community to medical personnel trained in hazmat symptomology and treatment.
- Recycling and disposal facilities should be accessible to the waste generators.
- Where vulnerability analysis indicates that a particular *maquiladora* presents an unacceptable risk in its present location, it should be relocated to a safer part of the community. Siting of new maquilas should be evaluated in terms of community vulnerability and subject to community approval.
- And finally, the EPA and SEDUE should cooperate in an active monitoring program of the soil, air and water around the maquilas, including drilling of test wells especially in areas with a history of heavy hazardous material use.

## **Before the Joint Legislative Study Committee on Hazardous Materials (1989)**

Michael Gregory, for the Sierra Club Grand Canyon Chapter, presented to the Arizona Joint Legislative Study Committee on Hazardous Materials, Arizona State Legislature, Phoenix, Arizona (17 October 1989)

Mr. Chairman and members of the Committee, my name is Michael Gregory and I am the Conservation Chairman of the Sierra Club's Grand Canyon Chapter, representing some 7000 members in Arizona. I live in McNeal, Arizona, in Cochise County, and make my living as a printer.

As the owner of a small business, I sympathize with people who complain that we've already got too many regulations, too many forms to fill out, and too many taxes. But I also know that we've got too many hazardous waste dumps, too much poison in the air and water and food and on the roads. Too much already in our bodies. Vigorous and comprehensive governmental regulation is the only viable means for dealing with the overall hazardous material situation.

The state's Director of Environmental Quality apparently disagrees. In explaining the state's policy on hazardous waste recently, he said that the department's hazardous waste policy calls for regulation only as a last resort. Contrary to the Environmental Quality Act (EQA), the current policy is an invitation to continued pollution and remediation costs. Public education, waste exchanges and volunteerism are valid components of an effective hazmat management program, but they are not a substitute for regulation. Some facilities will reduce their hazmat dependence voluntarily, some already have, but most will continue business as usual unless the law makes them clean up their acts.

### ***Scope of the Problem***

Hazardous materials occur in all parts of our environment: the air, water, soil, vegetation, wildlife, livestock, farm crops and in people. Air quality in our two major cities is among the worst in the nation. Pollution from industry and urban traffic has ruined visibility at the Grand Canyon and other parks. More than 80 miles of the Gila River are so contaminated with chemicals from agriculture, industry and urban runoff that the fish are unfit to eat.

Over 300 production wells in the state are known to be contaminated, more than 100 of them by toxic pesticides, nearly 200 with various volatile organic compounds. Pesticide regulation in the state is so lax that just two weeks ago a major pesticide user from Texas told the press that he was considering moving his farms to Arizona because here he wouldn't have to worry as much about worker right-to-know and environmental protection laws. Thousands of acres of land southwest of Phoenix are so contaminated with pesticides that real estate developers are afraid to build there.

Waste dumps from mining contaminate the air and water. Toxic landfills are a continuing problem unrelieved by sluggish clean-up efforts. Urban wastewater treatment programs are so ineffective that earlier this month the EPA had to sue Phoenix and Tucson.

Reports submitted under the Emergency Planning and Community Right-to-Know Act (EPCRA), show that in 1987 industry released more than 130 million pounds of toxic materials into the Arizona environment. Large as this number is, it represents only a fraction of actual emissions.

It does not include, for instance, several million pounds of pesticides. It does not include millions of pounds of hazardous materials released by companies with fewer than ten employees or otherwise exempt from reporting requirements. It does not include millions of pounds of toxic wastes generated in other states and brought into Arizona for treatment and disposal. It does not include what may be millions of more pounds released by companies that were supposed to report but didn't due to poor enforcement of state and federal right-to-know laws.

### ***Current Management Program***

As passed in 1986, the *Environmental Quality Act* was a hasty compromise in response to a grassroots initiative that would have required much stricter regulations. It's a whole lot better than what we had before, but the Act was not regarded by its authors as comprehensive environmental legislation. As protection against the total range of hazardous materials risks, it leaves some fairly wide gaps. For instance:

1. It focuses on water quality to the relative exclusion of other hazmat concerns.
2. It does not address toxic air pollutants.
3. It does not adequately address hazardous wastes.
4. It neglects contaminants in drinking water systems.
5. It does not address food purity.
6. It exempts most pesticide use from regulation.
7. Except for some farmworker issues, it does not address worker right-to-know.
8. It does not address emergency planning or community right-to-know.

It also suffers from a lack of timetables and hard deadlines for implementation. The Department of Environmental Quality was created by the Act to "provide for the prevention and abatement of all water and air pollution. . . . [and] prevent pollution through the regulation of the storage, handling and transportation of solids, liquids and gases which may cause or contribute to pollution," but the department has been painfully slow in issuing abatement orders and in requiring polluters to adopt preventative measures. Three years after enactment, large portions of required rules have still not been written or adopted, no cleanups have been completed, and DEQ has not become the strong advocate for the environment mandated by the Act.

But DEQ is not the only agency involved with hazmat management. A comprehensive management program will cover several statutes and fifteen or so agencies.

### ***Management Direction***

We don't want to open the EQA up for wholesale revision by violating the negotiated agreements that allowed its passage, but where needed to protect public, occupational and environmental health, the EQA and the state's other hazardous material statutes should be strengthened. The EQA should be seen as a beginning and a model for other statutes, not as the final word.

Last session, legislative discussion focused on hazardous waste. In terms of the cradle-to-grave hazmat cycle, we were mostly watching the grave. But hazwaste is only the end product of

earlier processes. Effective control of hazwaste requires regulation of the whole hazmat cycle: regulation of raw materials at the front end of the cycle; regulation of their products in the middle phase; regulation of wastes at (what is, hopefully) the end.

The goal of an effective hazmat management program is not zero risk, but elimination of unnecessary, avoidable risks. The main strategy should be prevention rather than cleanup; hazard abatement rather than risk management and remediation. Regulation rather than wishful thinking.

The attached list of 13 issues and strategies represent some widespread public concerns about hazardous materials in Arizona. Ten of the issues are discussed briefly in my written comments, along with one or two strategies for dealing with each issue. In the interest of time, I'd like to focus on just a four or five of them now. I'll be glad to discuss any of the points with you in more detail..

### *1. Regulatory Coordination*

The current hazmat management situation has grown up haphazardly in the literal sense of the word. Rules and policies are inconsistent among the various agencies. There has been little oversight or coordinated guidance. Consequently, hazmat regulation in the state is fragmented and ineffective. Our total body burden of toxic substances comes from a great many sources and is not adequately addressed by the traditional, departmental approach to management.

We recommend that DEQ make an audit of current hazmat use and regulation in the state to determine how much of what kinds of hazmats are used and regulated by which agencies, and where there are gaps, overlaps and contradictions in existing statutes, rules and regulation.

Within one year of enactment, DEQ should establish a State List of Hazardous Materials (SLHM) and based on that list, establish a State Priority List (SPL) of the 500 most hazardous. Then, every agency that regulates hazmats should establish an Agency Priority List (APL) of the 100-200 materials on the State List that present the highest hazard in the areas of their jurisdiction, and regulate them intensively in order to reduce the hazards as quickly as possible.

### *2. Source Reduction*

The State should adopt a policy to reduce hazardous waste generation by 50% over the next five years. This goal can be met by requiring mandatory toxics use reduction and waste minimization. Massachusetts and Oregon statutes can be used as models.

The law should prohibit production and sale of any hazardous waste for which there is no safe, available disposal method, and should require all facilities that emit air toxics to install Best Available Control Technology (BACT).

### *3. Food Safety*

Over 70 pesticides of the 350 registered for use on food, have been identified by the EPA as carcinogens whose residues are banned from foods by federal law. Yet, the federal program for pesticide residues takes very few samples, tests for only a few pesticides, and does not enforce the legal prohibition against residues of cancer-causing pesticides. The Ag and Hort Commission (ACAH) has discontinued its residue testing program. The result of all this non-regulation is contaminated products sold and consumed.

We recommend that by 1992, the State require labeling of foods and feeds to show what pesticides were used on them; by 1995 require disclosure of all pesticide residues in the products; and by 1997 ban residues in food, feed and drinking water of all pesticides that cause cancer, birth defects, nerve damage, immune-system disease or other chronic health problems.

The Department of Health Services should establish an effective residue testing program for food and feeds sold in the state and remove from sale any product contaminated beyond established tolerances.

In order to further promote food purity, the State should establish an Organic Produce Certification Program and require that produce labeling conform to State standards.

#### *4. Enforcement*

Inspection and monitoring programs are weak in all agencies involved with hazmat regulation. We recommend that frequencies of inspections and sampling and certain percentages of agency budgets earmarked for enforcement be established by statute.

Penalties for violation of hazmat rules are not generally severe enough, or frequent enough, to act as deterrents. Arizona environmental criminal laws are not as strict as those of other states (cf. California, Florida) or as federal environmental laws.

We recommend that hazmat regulatory agencies and the attorney general be mandated by statute to institute formal enforcement proceedings against serious or repeat offenders; that state's environmental criminal statutes be at least as strict as federal laws; and that anyone who knowingly violates a hazmat permit or license condition be subject to criminal prosecution.

Fees and penalties should be set high enough to cover all the State's costs for administration and enforcement of the hazmat program.

#### *5. Transport*

Transportation by road, rail and pipeline presents some of the highest risk situations in the cradle-to-grave hazmat cycle. It is a growing threat. Thousands of pounds of hazmats of all classes are enroute in Arizona every day, potentially endangering densely populated urban areas and sensitive environmental areas. Among the highest risk locations are truck and train transfer points, temporary storage stations, and yards where hazmats are kept for varying lengths of time. 40-60% of all trucks inspected fail to pass safety inspections. During a 5-day inspection crack-down in June, 1989, 56 of 82 trucks hauling hazardous waste were found by a Phoenix-area strike force to have serious safety violations.

We recommend that transporting hazwaste without a hazwaste license or failing to file a hazwaste manifest with the State carry criminal penalties, and that the State establish a vigorous safety inspection program for trucks carrying hazardous materials, including spot checks at border inspection stations and railway terminals.

#### *6. Hazardous Waste*

The hazardous waste problem gets worse every day. We recommend that corrective measures be taken as quickly as possible.

First, the State should put a five-year moratorium on the siting of new hazwaste facilities and use

that time to make a study of the aggregate and cumulative effects of State's current and alternative management options, including a comprehensive hazard analysis of hazmat transport. The state hazwaste facility at Mobile should not be permitted until that study is done and the impacts of the facility are shown to be acceptable.

Second, we should stop importing hazardous waste. Arizona has become a dumping ground for other states because our regulation is so weak and our fees so low. If federal pre-emption won't allow an outright ban, we should raise fees so it becomes unprofitable to ship wastes into Arizona. The fees for handling wastes should be at least as high as those charged by states that export to us. In some cases (dioxin-bearing waste, for instance) they should be higher.

The Mobile facility should be restricted to wastes generated in Arizona. It's a contradiction in terms to say that we're trying to reduce the waste problem when the state facility requires import of two to three times more waste than the state generates.

The State definition of "hazardous wastes" should be broadened to include "non-RCRA" wastes and all other substances regulated as hazwastes in other states. A high percentage of the hazwastes California ships here, for instance, escape proper regulation because they are not identified as hazardous in Arizona law.

#### *7. Aquifer Protection Permits*

ADEQ has established a priority list for issuing Aquifer Protection Permits to facilities that were in existence when the EQA was passed; but the agency has issued few APPs to such facilities and has set no timetable for issuing them. Meanwhile, many facilities continue to operate under the less stringent protections of the superseded Groundwater Protection Permits, and some without any water protection permit at all.

We recommend that the Legislature set a deadline of five years for ADEQ to complete Aquifer Protection permitting and re-permitting of existing facilities that discharge toxics.

#### *8. Hazmat Response Teams*

In most counties, there is little or no public sector capability for effective management of hazardous material incidents. Maricopa and Pima Counties have the only trained and equipped hazmat response teams. Given their lack of equipment and training, local responders in the outlying counties can usually do little more than locate an incident, secure its perimeter, issue warnings to the community, and call for help from the Phoenix-based ADPS/ADEQ entry team. If the State team is not elsewhere engaged, response to some outlying areas will ordinarily take hours, when even a few minutes may be critical.

We recommend that the State provide funds for development of fully-equipped hazmat response teams in outlying counties.

#### *9. Emergency Planning Committees*

Volunteers on Local Emergency Planning Committees have donated thousands of hours in developing and maintaining local emergency response plans, pursuant to requirements of State and Federal law. They are hampered by an utter lack of funding. The committees cannot function effectively without staffing, training, equipment, supplies, etc. We strongly recommend that the State fund LEPCs to cover costs of staffing, materials, postage, etc. and extend their function to include participation in hazmat facility permitting.

The EQA requires new subdivisions to comply with rules on water supply, sewage, garbage, and runoff. Developers should also have to disclose the potential vulnerability of planned subdivisions to risks from hazmat facilities in the vicinity.

#### 10. *Community Rights*

We recommend that the State empower local committees representing a cross-section of the potentially impacted community/communities, to negotiate operating conditions with applicant hazmat facilities and to advise state regulators on permit requirements. A good deal of the unrest in communities like Kingman could be avoided by giving the communities a direct voice in the permitting process.

At present, Arizona law does not require State agencies to disclose the potential environmental impacts of proposed State or State-funded actions. Over half of the states (Michigan and California, e.g.) have such "mini-NEPA" laws, patterned after the federal *National Environmental Policy Act* (NEPA). We recommend that Arizona pass one too, so that the impacts of actions like the state hazwaste plan can be fully scrutinized before adoption.

Just as the State can set stricter standards than the federal government, so should the State guarantee the right of local agencies to set and enforce rules that are stricter than the State's and, what may be most important, the State should guarantee the right of local communities to say "no" to proposed hazmat facilities in their backyards. It is not enough to say that communities have a right-to-know; once the risk is known, the community should have the right to protect itself. The right-to-know implies the right-to-denial.

Mr. Chairman, thank you for the opportunity to make these comments.

## **An Environmental Agenda for the 1990 Arizona Legislature: An Outline (1989)**

Michael Gregory, outline of Sierra Club Grand Canyon Chapter comments to the Arizona Joint Legislative Study Committee on Hazardous Wastes (October-November 1989); presented to the Governor's Commission on Arizona Environment, Phoenix, Arizona (1 December 1989)

The Grand Canyon Chapter recommends that the following reforms in Arizona laws and regulations be adopted by the Arizona Legislature during the 1990 legislative session. The Chapter will be tracking these and other issues and will score legislators according to their votes on critical issues.

The main principle behind this agenda is that the regulatory system is too open to industry pressure. Environmentalists cannot afford the time and money to be in Phoenix all the time to watchdog DEQ and the other agencies, so we recommend that protections be put into statute whenever possible.

The main concerns that repeat over and over in the following recommendations are:

- Need for increased public participation (no more, "thanks for the input")
- Need for public disclosure (cf. right-to-know and the need for a state or "mini-" NEPA)
- Need for increased public and environmental protection (cf "right not to be poisoned," "right to open space," "birthright to a natural world")
- Need to guarantee local rights (i.e., no preemption of state's rights by feds, no preemption of local rights by state)

### **Water Transfers**

- Statewide Active Management Area (AMA), requiring safe yield of groundwater (i.e., "no more taken out than goes back in")
- No interbasin transfers
- If transfers are allowed, require full environmental impact protection at both ends
- Prior approval of community at source
- Proof that receiving community practices maximum water conservation

### **Biodiversity Protection**

- Prohibit destruction of native plant and animal communities on public lands (e.g., no conversion of chapparal to grassland to supply more water for Phoenix)
- No weather modification except what results from clean-up of environmental pollution (e.g., CFC reduction, e.g., or urban smog)
- Prohibit release to environment of genetically-engineered organisms
- Environmental impact clearance before pesticides are permitted on public lands
- Non-toxic management of pests on public lands (e.g., gophers, grasshoppers, saltcedar, mesquite, ravens)
- Strict protection of riparian habitats

### **Wildlife**

- Representation of non-consumptive users on Game and Fish Commission
- Method for non-consumptive users to contribute to Game and Fish Department programs (non-game stamp, e.g.).

- Equal requirements for ranchers and others when taking wildlife, including non-lethal first response, proof of damage by offending animal, etc. Repeal Stockkiller Law
- Site-specific environmental impact study prior to implementation of federal/state predator control programs
- Prohibit federal Animal Damage Control programs in Arizona
- Repeal bounties on lions, wolves, coyotes
- Establish public oversight committee of Game and Fish Commission
- Re-introduction of endangered predator species (Mexican Wolf, etc.)
- No reimbursement to ranchers for wildlife use of public lands
- Prohibit leg traps

## **Food Safety**

- Re-establish state testing program for pesticide residues in food
- Prohibit sale of food and feed that contains residues of substances that cause cancer, birth defects, other genetic disease or nerve damage
- Require labeling of food and feeds sold in the state to disclose what pesticides and other toxic substances were used on the food and what residues remain

## **Toxics and Other Hazardous Materials**

### *Definitions and Identifications*

- Expand definition of hazwaste to include asbestos, used oils, medical waste, PCBs, minewastes, and other materials designated as hazwaste in other states
- Establish and rigorously regulate priority list of hazmats in each dept/office that regulates hazmats (wastes programs, water and air quality, emergency planning, agriculture, mining, etc)
- Adopt stricter standards for groundwater quality protection (a non-degradation standard, e.g., or standards that protect aquatic life or prohibit degradation beyond EPA's Maximum Contamination Level Goals (MCLGs) or beyond a one-in-a-million risk of cancer or other chronic/genetic disease

### *Regulatory Coordination*

- Require DEQ audit of the effectiveness of the state's current use and regulation of hazmats (including hazwaste)
- Establish comprehensive, coordinated database and management program for all hazardous materials in the state, from manufacture to disposal
- Finalize all pending regulations expeditiously (e.g., set deadline for issuing Aquifer Protection Permits to existing facilities that now have only Groundwater Protection Permits)
- Implement rigorous cradle-to-grave tracking of all hazmats that enter or are produced in the state
- Guarantee right of communities to have stricter rules than the state and to veto hazmat facility permits
- Establish cooperative air/water monitoring with Mexico

### *Toxics Air Emissions*

- Prohibit emissions that present more than one-in-a-million risk of cancer or

- other genetic/chronic disease
- Require continuous emissions monitoring (CEM) of all air toxics sources
- Require Best Available Control Technology (BACT) for all sources

### ***State Superfund (WQARF)***

- Establish a dedicated revenue source
- Require deadlines for site cleanup at identified sites
- Repeal exemption for pesticide-contaminated sites

### ***Mandatory Source Reduction/Waste Minimization***

- Establish policy to reduce hazwaste 50% statewide by 1995
- Prohibit production & sale of waste for which there is no safe and available disposal method
- 5-year moratorium on siting of hazwaste disposal facilities until DEQ completes study of potential impacts
- Establish fee reciprocity/equivalence for wastes from other states
- Restrict state hazwaste facility at Mobile facility to wastes generated in Arizona
- Increase public education about hazmat risk reduction
- Set goal and plan to eliminate most dangerous wastes within 5 years
- Require large quantity users of hazmats and generators of hazwaste to write and follow toxics reduction plans
- Require maximum reduction of bulk and toxicity (through recycling, reuse, etc.) before disposal
- Establish deposit-return system for hazmat/hazwaste (i.e., charge fees at the front end of the cycle for production and import of waste-generating hazmats, then refund parts of fees for effective waste reduction and again for proper disposal of inevitable irreducible final wastes
- Mandatory city and county waste plans, including household hazwaste

### ***Emergency Planning/Emergency Response***

- Add public representative to Arizona Emergency Response Commission
- State funding of Local Emergency Planning Committees (LEPCs)
- Involve LEPCs in siting process for hazmat/hazwaste facilities
- State funding of fully-trained and -equipped hazmat response teams in rural counties
- Require subdivisions to disclose vulnerability of site to routine and unusual hazmat releases from facilities in the vicinity

### ***Enforcement***

- Mandate adequate percentage of budgets for enforcement
- Increase penalties/fines for violations, including criminal penalties for "knowing" violations: "polluters pay, and serious offenders go to jail."
- Keep Attorney General in prosecution role

### ***Transport***

- Require licenses for hazwaste transport
- Establish vigorous safety inspection for hazmat trucks, railroads and pipelines

- Track binational transboundary shipments
- Track through-state shipments
- Regulate hazmat/hazwaste routing through communities
- Limit "temporary storage" of hazwaste to 72 hours; require RCRA storage permit for longer stops
- Establish designated "safe parking zones" for transfer and loading points
- Require manifests for small quantity generators
- Expand technical assistance/public education programs to small generators & households

### **Solid Wastes**

- Mandatory source reduction plans by local governments
- Mandatory tipping fees
- Incentives for users of recycled materials
- Market incentives for production and use of recycled materials and products

## **How Not to Foul Our Own Nest in a Throw-Away Society: Some Suggestions for Legislative and Regulatory Reform (1990)**

Michael Gregory, presented to the Arizona Public Health Association Sixty-second Annual Meeting, "The Health of the Environment =The Health of the People, Mesa, Arizona (12 September 1990)

### ***Premises***

I'd like to begin by stating seven premises that underlie the following remarks:

1. In general, the public does not ask for a zero risk society (we have all become more sophisticated than that). What the public does call for is no more exposure to unnecessary risks, or avoidable risks. If risks are not necessary and can be avoided, they are not likely to be acceptable to the public who has to bear them.

2. There is a serious existing problem. For instance, Arizona industries last year reported almost one million tons of hazardous air emissions. That is down about 23% from the previous year, but most of the decrease is not real pollution prevention, but simply a switch from direct atmospheric releases to other media, especially landfills. Another statistic: the Department of Environmental Quality reports over 700 known toxic waste dumpsites around the state waiting to be cleaned up. And so on. To repeat premise number two, there is a serious problem.

3. More and more, and more and more stridently, the public is demanding that the problem be taken care of.

4. The public's right-to-know doesn't amount to much without the right-to-say-No, a right to stop a facility from being built in our collective backyard.

5. The technology is available now to achieve zero migration of toxics from most facilities.

6. What is lacking, what is needed, is not better science but political will and regulatory wherewithal.

7. The Governor and the Legislature need to be convinced that the problem and the public are serious, and provide clear policy and sufficient resources for DEQ to do what it was created to do, and for local communities to do the job they have to do.

With those premises in mind, let's look at a few possible corrective actions.

### ***Comprehensive Program***

First, the state should develop a comprehensive hazardous materials management program under DEQ, integrating efforts of all hazmat agencies and covering all phases of the hazmat cycle from cradle to grave. And notice that I use the term hazardous *materials*, a broad term that includes hazardous waste.

The current situation is that regulation is scattered among ten or more separate agencies, each with its own set of definitions on what is or is not a hazardous material, its own standards and its

own rules.

And, unfortunately, those agencies do not communicate very well with each other. The left tentacle of the regulatory octopus very often does not know what the right tentacle is doing. Or, sometimes, even that it exists.

A truly comprehensive, integrated program will have to look not only at air and water pollution, but at soils and agriculture, energy sources and use, transportation and, perhaps especially, commerce, since a great many of our problems stem from the state's growth-at-any-cost policies. I suggest to you that it is high time for Arizona to stop concentrating on industrial growth and focus instead on how to deal with the fouling that inevitably follows from overcrowding the nest. I agree with many citizens of this state that what we live here for is fast disappearing as a result of the government's pro-growth policies. Instead of traveling around the world offering sweetheart deals to polluting industries, the Governor would do better to promote non-polluting low-impact development. The future of Arizona is in tourism and retirement, not poison gas plants and imported hazardous waste.

### ***Hazard identification***

To begin with, we need to identify the problem. At present, the state does not even know what hazardous materials are out there, or in what quantities, or where and when. We don't even have a good definition of what is hazardous.

The state's definition of hazardous waste, for instance, is the same as the EPA's federal definition under the *Resource Conservation and Recovery Act* (RCRA). It does not include many materials that other states call hazardous, like among others, asbestos, infectious wastes, and PCBs.

Besides the definitional part of hazard identification, there is a physical procedure component, and the state program (or lack of it) is weak there, too; the state's reporting, monitoring and recordkeeping is grossly inadequate. Pesticide monitoring, for example: the state's 1986 *Environmental Quality Act* (EQA) directs DEQ to monitor groundwater for a short list of pesticides known as the "Groundwater Protection List" because they have all been identified as potential groundwater contaminants. The last DEQ annual report on that monitoring program indicated that the Department had monitored for only about 20% of the chemicals on the list. Whether due to lack of resources or political fortitude, the Department simply wasn't looking for all the chemicals the law says they have to.

And there is little if any monitoring done for toxic (i.e., carcinogenic) air emissions, except in special situations (especially those that have attracted public attention). Neither EPA nor the state requires it.

### ***Hazardous Waste***

Let's switch for a moment to the hazardous waste situation. A paper handed out to the Governor's Hazardous Waste Technical Advisory Committee at their visit to the ENSCO site last week<sup>1</sup> indicates that of the total 436 hazardous wastes EPA lists as requiring pretreatment before landfilling, 49% are classified as "incinerable" and for another 161 of the wastes (37%) EPA says incineration is "the only legal method of treatment." In order to identify what kinds of

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<sup>1</sup>John M. Krecisz (n.d.), "The Effect of Landban Restrictions on the Waste Approval Process for a Commercial Incinerator," Chemical Waste Management Technical Center.

treatment and disposal needs we have, you would think you'd want to know exactly which wastes are included in that EPA incineration-only list, but as far as the Governor's Committee could find out the other day, DEQ hadn't yet identified which chemicals were on that list.

Once the state has identified what wastestreams we have, the next step is to make a hazard assessment, prioritize the list, identify the worst bad actors, and figure out how to get rid of them. Southern California, for instance, analyzed its waste streams and decided to target highly hazardous chemicals like dioxin for quick elimination.

Arizona should do the same. A good way to begin is to adopt a goal of 50% reduction in wastes over the next five years. And then pass a mandatory toxics use reduction law like other states have done (Massachusetts, Oregon, and Indiana, for instance), requiring that waste-generating industries reduce their toxic substances use, and consequently, their wastestreams, as much as possible.

Arizona could use a law that requires a maximum reduction in volume and toxicity of any waste before it is delivered to a disposal or incineration site. Maximum pre-delivery reduction is what many industry people say, and what many other people think EPA already requires before landfilling a waste, but all EPA really requires is a certification on the manifest that the generator decided he had treated the waste as much as he thought was economically feasible.

Arizona requires even less than that. In Arizona we don't even have what could properly be called a waste reduction program; rather, we have a completely voluntary waste minimization program. Neither the state or the federal program has a hammer, and without a hammer, it just won't work.

Not only should the state identify the wastes we have and establish a vigorous source reduction program with stiff criminal penalties for violators; but the Department should develop a strong technical assistance program geared especially to the needs of small quantity generators, helping them achieve the maximum achievement goals.

### ***The State hazwaste facility***

There has been a lot of discussion about the proposed state hazardous waste facility at Mobile. I have no great problem with the idea of a state site. Wastes that already exist and those to come have to be treated somewhere, and although centralized facilities have some problems that on-site handling avoids, there are disadvantages to decentralization, too. As the Department says, regulation of all the on-site operations, could be very difficult; but on the other hand, the State is already supposed to be policing generators, so the increased enforcement may not amount to that much of a problem.

Mobile may not be the right place for the facility and that issue ought to be revisited, but the real question for me, and for a lot of other people, is what should be at that site. For instance, how big should it be, and should it have incinerators or just the landfill that was originally projected?

The incinerator question is the main one on most people's minds, especially the people in southwest Phoenix who are closest to the stacks. There is good reason to be concerned about incinerators; for one thing, even EPA admits that 40-60% of the Products of Incomplete Combustion (PICs) that come out of incinerator stacks are unknown compounds with unknown health effects. But on top of the hazard, there is the fact that we just don't need an incinerator. We don't generate enough wastes in the state to justify it.

According to DEQ's Capacity Assurance Plan, Arizona only generates about 1700 tons of incinerable waste a year, one sixth to one tenth of the total waste generated in the state. Nobody has tried to figure out how much of that would be left if it all had to undergo maximum reduction before it went for incineration, but it would likely be a lot less. But in any case, 1700 tpy is not a sufficient amount of waste to justify an incinerator with all its attendant acute and chronic hazards. Far better to keep shipping it out of state to established incinerators like we do now.

Rather than incinerators, what I'd like to see at the state site is a full-size demonstration project for non-polluting alternative treatment methods—bioremediation, solar conversion, etc., something closer to the recycling plant that was originally proposed before ENSCO put in its bid for incineration.

The only reason we have incineration proposed at the site at all is so the contractor can make a profit by importing more wastes from California and other states. Incineration is a very profitable business, especially since EPA started pushing it as an alternative to landfills, and especially with substantial incentives from the state. Most states don't want them and don't have them. They'll be only too glad to ship their wastes to Arizona if we give them the opportunity.

But we don't need an incinerator for our own wastes, and it's hard to believe that Arizona needs California's wastes. Unnecessary and avoidable. I suggest to you that if a private contractor can't make a profit without trucking wastes in from California and elsewhere, then we don't really need a private contractor, either. Rather than this so-called "state-private partnership," I'd prefer the state to renew its social contract with the people of Arizona and run the facility itself with oversight by EPA.

A state-run facility on a state-owned site. An Arizona facility for Arizona wastes. No incineration. Mandatory maximum pre-delivery reduction. Non-polluting alternative technologies. Thorough wastestream identification and characterization. What else? Two things come to mind, two laws that the state needs to enact.

### ***Environmental Impact Analysis***

First, we need a state environmental policy act, a SEPA or mini-NEPA, as they're called, a law modeled after the primary federal law, the *National Environmental Policy Act* (NEPA) that requires a thorough investigation and disclosure of potential environmental impacts of any project undertaken with public resources. NEPA requires environmental impact review for federal projects, and several states have such laws, but Arizona doesn't, just like we don't have a source reduction law or a mining reclamation law.

For hazardous waste facilities, RCRA and the state require in-house assessment of environmental impacts, but two major features of NEPA are not honored in the RCRA permit process: public participation is nowhere near as thorough as NEPA requires, and RCRA does not require any consideration of alternatives: the state and EPA have not compared the potential impacts of the ENSCO facility with other possible actions. The state decided it wanted this kind of facility and has not bothered to consider any alternatives in the permit.

### ***Air Toxics Control***

Besides a state NEPA, we need a strong air toxics control law. Neither the state nor the feds require much in the way of limits for air toxics, and nobody does much in the way of monitoring for them. The monitoring proposed in the permits for the ENSCO facility, for instance, is so full of holes that it would be laughable if it weren't such a serious situation.

### ***Household wastes***

In the interests of time, I'll get off the topic of the state hazwaste facility and close by touching very briefly on a few other hazardous materials issues in the state.

Household hazardous wastes are a major concern. Let me suggest just one way of getting at that problem. Community pick-up days are a good idea, but the way to get source reduction rather than just improved disposal is to educate the public about the hazards of the products they buy and give them alternatives. A major principle behind California's famous Proposition 65 is that full disclosure of ingredients is essential to the public's ability to make reasoned choices.

If we really want people to know what they're buying, we should require labels that are readable. Tiny little labels full of unpronounceable names do not inform the public. What we need are labels that spell out in large print and plain English and Spanish that this product contains such and so ingredient that has been shown to pollute groundwater; or that this ingredient is known to cause cancer or birth defects. Marketing research has repeatedly shown that when given the choice, consumers go for the cleaner product, even if they have to spend a few cents more. Full disclosure is a basic part of the democratic process.

### ***Food safety***

Before closing, I'd like to mention two more basic civil rights issues. First, food safety. I strongly believe that we have a right not to be poisoned by the air we have to breathe, the water we have to drink, the soil we have to walk on, and the food we have to eat. We have a federal law, the Food and Drug Act, that is supposed to guarantee food purity, and a special clause of that law known as the Delaney Clause specifically says that thou shalt not put carcinogens in our food. But the EPA has never enforced that clause for pesticides. Over 60 carcinogenic pesticides are used on food in this country and I, for one, am tired of being exposed through that route. The state should prohibit residues on food of all pesticides that cause cancer or other genetic disease.

### ***Community empowerment***

Another area of civil rights of great concern is local control. As a rural resident, I am a strong supporter of the rights of communities to protect themselves. It is very clear that the state and federal governments are not doing it and are not going to do it. If we want to cut down our exposure, ultimately we have to take action at the local level, no matter what the state and feds do.

Local communities need to become aware of their rights and their responsibilities for hazmat management. One solution, one that may be introduced in the state Legislature next year, is to require all local communities to do a thorough review, with full public participation, of pertinent environmental issues before allowing a hazmat facility to be sited in the community. The state should refuse to process any application for an environmental permit until the local community has gone through such a review.

In Cochise County, we are exploring something like this process as a result of public outcry against the siting of a chemical plant the county supervisors had approved. Following the decision of the company not to locate in Cochise County, the Planning and Zoning director went to the Local Emergency Planning Committee and asked them to participate in reviewing future proposed facilities for potential hazmat problems. The LEPC agreed.

For those of you who are not familiar with LEPCs, let me explain. The LEPCs were created by the federal *Emergency Planning and Community Right-to-Know Act* of 1986, and were mandated in every county by Arizona law in 1987. LEPCs are supposed to review haz- mat reports from covered industries, develop hazardous materials emergency response plans for their communities, and keep the public informed about the hazards. Like other state-mandated bodies, LEPCs are not funded. They are typically composed of volunteers from the private and public sectors with a smattering of county officials. Despite this burden, our LEPC decided to take on the added task of siting review because we think it is a potentially effective means of real pollution prevention.

Along with funds for LEPCs and environmental health personnel in local governments, the state should guarantee that local communities have not only the right to know, but the right to say no, the right to deny a facility the chance to pollute the neighborhood. I have great sympathy with the NIMBY syndrome. I don't want it in my backyard either. Under current laws and regulations, it is very hard for the state to deny a permit: once a company pays its two bucks and fills out on the dotted line, there is a presumption that the permit will be granted. Unless there's a major glitch in the application or an uproar in the press, the state is pretty much bound to allow a company to set up and pollute up to the limits of the law.

### ***Water pollution***

The last two areas I'll mention are water pollution and energy management. For water, just three points. First, the last Legislature in its wisdom passed a bill that requires all groundwater recharge operations to obtain an Aquifer Protection Permit (APP), except recharge projects using CAP water. I suggest that we revisit that decision and require APPs for all recharge projects.

Second, we should require that an environmental analysis be done for all water transfers to prevent the transfer from taking so much water out of an area that the water table loses its ability to adequately dilute contamination. This is especially a concern in rural areas where there is heavy pesticide use.

Third, as some of you know, the Sierra Club recently filed intent to sue EPA for failure to set water quality standards for surface waters in Arizona. I suggest to you that the only appropriate standard for discharge of carcinogens from wastewater treatment plants is zero. Like much of the public, I simply do not want carcinogens dumped in my drinking water or in the state's rivers, lakes and washes. The technology is available and should be used.

### ***Energy Policy***

Finally, in terms of energy policy, I will suggest very briefly four measures we should take to save energy and thereby prevent the pollution that energy production and consumption causes.

First, the state should do a thorough audit of how much and what kinds of energy are produced and used in the state, by whom, where, when, and with what costs, including those so-called "external costs" like environmental adverse environmental and public health effects.

Second, the state should switch its fleet to solar power, or hydrogen or some other non-polluting fuels as soon as possible. If it can't be done overnight, certainly it should be done within five years. And meanwhile, the fleet should be changed over to vehicles that get at least 45 mpg.

Third, we should require 50-75% solar energy on all new subdivisions.

And fourth, we should require every new subdivision to guarantee no net increase in pollution due to the extra miles of travel created by travel to and from the development. This is known as trip-reduction, and is a very important part of controlling the pollution that population growth brings.

## **Pollution Prevention in Occupational and Environmental Contexts (1993)**

Michael Gregory, presented to the Thirty-seventh Annual Western Occupational Health Conference and First U.S./Mexico Occupational Health Conference, "Forging New Partnerships," Scottsdale, Arizona (2 October 1993)

One of the main functions of Arizona Toxics is to facilitate information flow between grassroots organizations on both sides of the U.S.-Mexico border with larger governmental and non-governmental organizations in the capitols of both countries. In helping provide these linkage, we are able to keep information and resources flowing in both directions, so that, for instance, local groups are able to keep informed about policy decisions being made at high levels of government and, conversely, so that people passing laws and writing regulations in Washington and Mexico City are made aware of the practical, hands-on experience and needs of citizens working and living at ground zero.

One of the things I have learned by acting as a go-between in this manner for the past several years, is that everywhere I go people generally share certain basic beliefs about toxic substances and how we should deal with them. Everybody pretty much agrees, for instance, that we have, or should have, a fundamental right not to be poisoned. There is, of course, disagreement about how to present it, but very few people I've talked to think it's ok to be exposed, or to expose others, to toxic substances against our will or without our knowledge. And most people agree that we have, or should have, a right to know if we are being exposed, and to what degree, and what the associated hazards are. That is called the right to know, and it is generally accepted as a fundamental democratic right in this country, is implicit in the Mexican Constitution, and is increasingly being made explicit in policies, laws and regulations in both countries.

What I would like to do this morning is to discuss, from the private citizen perspective, some aspects of those two basic beliefs in terms of occupational health in the context of current legislative and regulatory dynamics, especially in the United States.

I should begin by noting that private citizens and citizen groups in general do not make much of a distinction between occupational, public, and environmental health. Especially in low-income and rural communities, workers and public, or workers and workers' families, are identical and ecological awareness has at last grown to the point that most people today seem to be aware that poisoning the environment poisons people. From the citizen perspective, the workplace environment, like other aspects of the economic environment, is a subset of the natural environment.

That is why the old OSHA strategy of protecting workers from air toxics by venting the vapors to the outside environment has never made much sense. Not only are such practices based on the invalid assumption that workers don't breathe the air once they leave the workplace, but they're based—like many of our health regulations—on the outmoded assumption that dilution is the solution to pollution.

That assumption is one I'll come back to in a few minutes, but first I'd like to lay out some of the policy context in which our discussions of human and environmental health are taking place. The primary political fact that advocates of human and environmental health protection in the U.S. must be aware of today, is that we are in the midst of the strongest attack against our health laws that has happened in our lifetimes. I'm not given to hyperbole or alarmist rhetoric or military metaphors, but it is clear to those of watching the scene in Washington, that an extremely well-financed, sophisticated attack is underway to gut our major environmental, public health and occupational health laws and regulations.

We have already seen the challenge made in court, with the loss of OSHA's regulations on Permissible Limits (PELs), in a decision that, as OSHA Administrator David Ziegler has said, leaves employees faced with "serious health hazards" (Ziegler 1993). In Congress, we are seeing even more direct attacks on Superfund; the *Clean Air Act*; the *Safe Drinking Water Act*; and the *Food, Drug and Cosmetic Act*. One of the main targets for these attacks is the health standards in these laws; the battlecry of the attackers is "Sound Science"; their rationale is cost-benefit; and their primary implement of destruction is risk assessment.

It is in this context that I'd like to share with you some of the citizen concerns about occupational, public and environmental health protection and the strong citizen support for the alternative strategy of pollution prevention.

### ***Recent Issues/Developments/Contexts***

As many of the papers being presented at this conference show, environmental health science has made some significant advances recently. Among other advances of particular concern, are our increasing knowledge about the serious, often subtle, effects of low-dose exposures; the effects of mixtures and other multiple exposures; and the prevalence of non-cancer and non-mortality effects.

We are learning, for instance, that pure reliance on clinical evidence of toxicity is not always reliable, since the health hazards of some substances, like lead, present major health problems over wide areas due to subtle, non-specific effects at low doses that don't show up in standard clinical tests (Silbergeld 1993). We are learning to redefine what we mean by dose by distinguishing between doses to an organism and effects at the tissue, cell and molecular levels (Birnbaum 1993).

Similarly, due in large part to recent research on dioxin, our concepts of dose-response are also in need of revision as we come to understand that "receptor-mediated responses may play a critical role in the carcinogenic actions of many chemicals" (Lucier et al 1993, 36). Our new understanding of the mechanisms of dioxin is leading us to a reevaluation of the entire class of chlorinated hydrocarbons (Birnbaum 1993), a recognition which suggests that similar reevaluations may be in order for other chemical classes as well.

More and more often we seem to be finding out that our old, Aristotelian view of cause-effect or dose-response relationships have often been too simplistic, and that in some cases "it is more relevant to look upon the entire complex of exposures as risky rather than to discuss confounding from various component exposures" (Axelson 1993). We are beginning to learn to talk in terms of "association" rather than "cause".

We have come a long way in the past few years, and the public in general is supportive of the new research, especially research in environmental epidemiology, because it appears to provide a great deal of support for the public's long-standing insistence (the many assertions of polluters and governments to the contrary notwithstanding), that chemicals in the environment are health problems, even in low doses and with difficult-to-diagnose effects (Davis 1993a), 1993b).

But of course, the more we learn the more we realize now much we don't know, especially how much we don't know about those very fields where our research is breaking new ground. Our new attention to classes and complexes, for instance, though it leads us to greater understanding of the interactive effect of mixtures (Birnbaum 1993; Davis 1993b), also shows us how little we really know about synergistic and cumulative effects (Goldstein 1993; Pounds 1993).

We are coming rapidly to a recognition of the importance of non-cancer effects, but his research, and the bureaucratic machinery that accompanies it, as always is very slow. For instance, though we have reproductive data for about 15,000 synthetic chemicals and about 2,800 have been evaluated for teratogenicity, and of those some 30-40% have tested positive, only about 30-4 are officially recognized as teratogens—about the same number recognized as carcinogens (Kipen 1993). We have barely scratched the surface in coming to grips with the frightening prospect of transgenerational mutations.

Although we have come a long way, we still have a long way to go. Very few of the 70,000 or so synthetic chemicals in commerce have been evaluated in detail for exposure and toxicity potential (Goldstein 1993). Despite the recent advances, in many ways our situation is not much different from that described in 1987 by former EPA Administrator Bill Reilly who said in summarizing the 1984 National Research Council report, that “fewer than 2 percent of the chemicals currently used for commercial purposes have been tested sufficiently for a complete health hazard assessment to be made. Adequate information to support even a partial hazard assessment is available for only 14 percent of the chemicals; for 70 percent, no information is available. Moreover, these percentages refer only to human health hazards. In general, environmental hazards are even less well understood” (Reilly 1987, p.425).

For mixtures such as those found in hazardous waste sites and most other real-life, non-laboratory environments, the situation is even worse. As Dr. Lucier reminded the ATSDR Congress on Health Effects of Hazardous Waste in Atlanta in May, “The difficulties in estimating the health consequences of exposure to complex mixtures in enormous and creates huge uncertainties in risk assessment for hazardous waste” (Lucier 1993).

### ***Data Gaps and Risk Assessment***

As Dr. Lucier and Bill Reilly caution, if our scientific knowledge is uncertain, risk assessment can only compound that uncertainty. Risk assessment is herir to all the data gaps and uncertainties of our basic knowledge. And while complex modeling can overcome many of the gaps in our understanding of exposure, without knowledge about basic toxicology, the accuracy of our effects models is subject to far greater error (Goldstein 1993).

Nonetheless, there is a greater and greater effort in some circles to substitute risk assessment for knowledge, and if risk assessment proponents (a great many of whom are employees of or apologists for the chemical industry) have their way, risk assessment methodology will soon be enshrined in many of our state, federal and international laws.

For instance, a Bennett Johnston amendment to the bill for elevating EPA to cabinet level would make risk assessment a mandatory standard operating procedure throughout the new department. EPA’s proposed revisions to the *Safe Drinking Water Act* would replace the current requirement to set new standards every three years with a “risk-based” process. Proposals for reauthorizing Superfund would eliminate strict health-based clean-up standards with a sliding standard based on presumed future use of the sites and estimates of “acceptable risk.”

Similar efforts are taking place at the state level. The Arizona Department of Environmental Quality, for instance, has recently decided that more than two-thirds of the hazardous air pollutants previously listed by the state on the basis of health protection will be dropped from the regulatory net because they did not pass the new risk-based screening model, primarily due to lack of toxicity data for the chemicals—as tough chemicals like people were innocent until proved guilty. In addition, like several other states, Arizona intends to adjust its future regulatory agenda according to the results of an EPA-funded “comparative risk” study.

Internationally, for several years we have seen an aggressive attempt by the U.S. government to establish risk assessment as universal methodology for standards-setting under trade agreements like the North American Free Trade Agreement (NAFTA) and Organization for Economic Cooperation and Development (OECD). Standards that are not based on such methodology would be subject to challenge as non-tariff trade barriers or some other sanctions.

Probably the most significant of the current efforts is the attempt to replace the *Federal Food, Drug and Cosmetic Act*'s "zero carcinogenic additives" standard for pesticide residues with a so-called "negligible risk" standard (which, according to EPA, and depending on which of several bills introduced in Congress we're talking about), could mean anywhere from a mortality risk of one-in-ten-thousand to one-in-a-million. (One bill, which currently has 194 sponsors, would eliminate the definition of "negligible" altogether, leaving it up to EPA to decide on a case-by-case basis.) In 1987, the National Academy of Sciences estimated that just a few of the pesticides in our foods are responsible for 2.1% of all U.S. cancer deaths, or about 10,000 deaths each year (NAS 1987). And that does not take account of the aggregate and cumulative effects from our many other sources of pesticide exposure. In addition, just couple of months ago the Academy announced that our current regulations, based on standard risk assessments, fail utterly to protect our children from pesticide residues (NAS 1993).

In light of these and other studies indicating significant body burdens of pesticides throughout our population (Hill 1993), the administration's proposal for continued reliance on risk assessment is more than a little alarming.

### ***Procedural and Conceptual Problems with Risk Assessment***

We don't have time to go into all the problems with risk assessment, but I'll mention a few, to give you an idea why the public is so opposed to the methodology. We see two broad kinds of problems with risk assessment, procedural problems and conceptual problems.

By procedural problems I mean that risk assessment is just generally bad science. For one thing, it is inevitably based on exactly those gaps and uncertainties we have been looking at in our scientific database. There are so many unwarranted assumptions and uncertainties in typical risk assessment that the procedure is little more than a computer game that allows the assessor to come up with any answer his or her employer requests. Instead of being an honest attempt to look at data and arrive at a scientific conclusion, risk assessment is typically a backdoor effort at risk management with a preordained goal.

Conceptual problems with risk assessment involve some of the basic principles of environmental and human health protection: participation, right to know (RTK) and prudence; all three are involved in nine common questions (Montague 1992) citizens ask when confronted with risk assessment as the basis for toxic substance regulations—whether it is air emissions, waste dump clean-ups, water discharges, pesticide residues on food, or what have you.

The questions include:

- 1) What gives polluters are right to pollute at all?
- 2) Who bears the risks?
- 3) Who gets the benefits?
- 4) Who decides what risk is acceptable?
- 5) How is that decided
- 6) Who profits from that decision?
- 7) Are the due process rights of those affected/exposed considered?

- 8) What alternatives to exposure were considered?
- 9) What alternatives to risk assessment were considered?

Risk assessment is supposed to be a means to answer such questions, a way to address our fundamental right to know, but in practice risk assessors seldom or never address questions like these.

Consequently, risk assessment *as practiced* (if not in theory) starts from the premise that there is such a thing as acceptable exposure and acceptable risk and figures out how to get there. It assumes that what is of interest is mortality, not health. It looks at one chemical at a time, not taking into account that such an approach means allowing, around a typical incinerator or copper smelter burning hazardous waste, for instance, not just one death in a million, but one death from arsenic, one from cadmium, one from lead, and so on.

Two of the main conceptual problems with risk assessment, are that it buys into the notion that a chemical is innocent until proved guilty and it continues to endorse the disproved assimilative capacity hypothesis and its corollary belief in dilution as the solution to pollution. Both these conceptual errors, when applied in policy and regulation, in effect bestow a right to pollute.

The assimilative capacity model obviously has failed. For example, our belief that a little bit of PCB here and there won't hurt us has put so much PCB into the environment that if we were to try to legally dispose of a whale washed up on the beach, we would have to treat it like toxic waste because it will almost certainly contain more than the legal threshold of 50ppm PCB (Rogan 1980).

Similarly, a few years ago studies found that the breast milk of U.S. mothers contains such high levels of PCBs that it would be banned by FDA if sold. The same studies indicated that mother's milk would not meet FDA standards for DDT and other pesticides either (Rogan 1980)—a fact that is of particular concern in light of the recent studies on relation between DDT and breast cancer.

Continued reliance on risk assessment practically guarantees that we will continue to have so-called "unexpected environmental disasters, will continue in perpetuity to have unclean waste sites, and will continue to have "a little bit of cancer here, a little bit of nerve damage there" in the air we breathe, the water we drink and in the food we eat and our children eat. Clearly, if we are going to pass a sustainable system on to future generations, we can't keep filling up the world and our bodies with toxic junk; we have to stop the poisoning, clean up the existing messes and prevent them in the future.

Probably in all this the concept that the public finds most disturbing is the concept of acceptable risk. Risk-based contamination is tolerated only because of the anonymity of victims. As environmental attorney Paul Merrell has pointed out, if the names of the victims were known, the courts would have a rough time distinguishing between policies based on risk assessment and premeditated murder (Merrell and Van Strum 1990). We don't allow someone to shoot a gun into a crowded room, but we regularly permit polluters to shower whole populations with deadly contaminants, knowing just as surely as if it were a gunshot that some of us will die as a result. Permitting pollution based on risk assessment estimates boils down to a decision about how expendable—and as we all know, the answer is not usually going to be those who live in places like Scottsdale.

Risk assessment just asks the wrong questions. From the victim's point of view, the question is not "How much of this stuff does it take to kill me?" Nor is it the polluter's question: "How

much can I get away with?" Those are end-of-the-pie questions of the kind we've been asking for a long time, and all we end up with is poisoned urban air, dead streams, holes in the ozone layer and people getting sick, especially workers who are on the toxic front lines of chemical production and clean-up. Ultimately, given all the inevitable uncertainties, it is not a question of toxicity or risk at all, but of ethics and civil rights. We have a right not to be poisoned.

But the ethical argument goes beyond even that. In general the public doesn't care, and justifiably doesn't care, how much or how little or in what way these substances kill and maim. Stated bluntly, the citizen feels that whether or not a given substance is toxic, or whether somebody's risk assessment says it is or isn't, we have a right not to have it in our lungs and blood and chromosomes.

Sound toxics policy depends on a combination of science and social values, and in a democracy one of the basic social values is the right to privacy, the right not to have our most personal body space invaded. In this scenario, toxic torts are beside the point; harm does not depend on proof of adverse effect or any effect: the violation is in the exposure itself.

Not everyone takes that position, of course (though it is fairly common among exposure victims around hazardous waste and pesticide misuse sites). Generally the public is more accommodating and does not ask for zero risk, but simply for maximum reduction of risks that are avoidable and unnecessary.

But the difference is often academic; even without a searching examination of the meaning of the word *need*, we know that alternatives are or could be available for most toxics, making their use both avoidable and unnecessary. *Zero* is a four letter word that polluters and regulators don't like to hear, but it is exactly zero that the public is demanding, and, I would argue, has a basic human right to, especially where more than zero is unnecessary and avoidable: zero discharge of pollutants into our waters, zero residues of carcinogenic pesticides on our food, zero emissions of genetic toxins and nerve poisons into the air we breathe; zero migration of teratogens and immunotoxins from our waste and military facilities.

Whichever side you take, I hope we can agree that instead of spending so much time and money (as risk assessment does) trying to find out how and how much Brand XX is bad for us, we should be asking how much and in what way we can prevent exposure in the first place. If we want to prevent disease rather than just identify it and study it and treat it, we have to prevent exposure and that means preventing pollution at the front end of the pipe.

Not that we should stop research. As I said earlier, the public in general is in favor of better science, more testing, more epidemiological studies, but the public sees at least three dilemmas here. First, if we hold off regulation until all the test results are in (as those attacking our pollution laws in the name of "sound science" suggest we should), we will never be done, since there are over 70,000 chemicals out there and we add 500 to 1000 new ones each year. Second, although the public generally favors more research, it will not favor research funding if it means that funding will be taken away from clean-up efforts and health care. And third, if we wait until epidemiological studies show harm, it is too late: the harm has already been done.

Rather, we should liberate our decision-makers who have for too long been caught between insupportable risk assessments and after-the-fact evaluations of epidemiological studies. The alternative is pollution prevention or, as it's called in most of the rest of the world, clean production or the Precautionary Principle which, as simply stated by bodies like the U.S. - Canada International Joint Commission on the Great Lakes, says that since we obviously can't control persistent and bioaccumulative chemicals once we create them, we must stop producing

them in the first place and turn our resources toward cleaning up the contamination we already have (IJC 1992).

A precautionary approach is especially relevant on the U.S.-Mexico border where we have a chance at the beginning of increased development to require pollution prevention up front for new facilities.

### ***Pollution Prevention is Disease Prevention***

Science, of course, never has all the answers. That is a basic condition of empirical knowledge. It is evolving. That does not mean, as the pro-pollution forces and their media apologists would have us believe, that science without final answers is not sound science. Far from it. Sound science is exactly that science which is as clear about its data gaps as it is about its positive and negative findings. As Dr. Lucier and Barry Johnson emphasized at the recent ATSDR Congress, it is especially important today that responsible scientists “communicate the uncertainties” (Lucier 1993; Johnson 1993).

Understanding the effects on our regulations of the biases built into our models is a basic component of the public’s right to know, and an essential part of sound policy-making, since sound policy can only result from full evaluation of science coupled with social considerations—including consideration of matters like environmental justice and long-term sustainability. As science professionals, you have a special role to play: in helping to disclose the uncertainties, demystifying risk assessments, explaining them to workers and the public.

But right to know is not an end in itself. Once we know, we must have the right to *say* no. If we can agree on the goal, the question is now to get there. And where to start. One good place, as the International Joint Commission recommends, is the banning of persistent bioaccumulative chemicals as we have banned PCBs in the past. We could begin by expanding the Delaney Clause of the *Food and Drug Act* to keep not only carcinogens but teratogens, neurotoxins, immunotoxins and other genetic poisons out of our food; and amend the *Federal Insecticide, Fungicide and Rodenticide Act* (FIFRA) to keep them out of our air and water. Toxics Use Reduction is the heart of any pollution prevention program.

Next we need to start implementing the prevention options mandated by the *Toxics Substances Control Act* (TSCA). Congress, like the public, has never seen occupational health as much different from community health, and TSCA was originally a project of labor and environmental organizations to make the link between worker and community health, between EPA and OSHA standards. But TSCA is one of our most crippled environmental laws. EPA and NIEHS are 10 years behind on reports and testing of chemicals.

So we need to speedup the standards-setting under TSCA, to dovetail it with OSHA and EPA standards, and to make sure that the standards fully protect against our ignorance and uncertainties about exposures and effects. But more directly than just setting standards for substances, we need to look at processes, and fortunately we have an immediate opportunity to do this since EPA is about to issue draft Process Safety Management (PSM) regulations.

### ***Process Safety Management***

The PSM provisions of the *Clean Air Act* Amendments of 1990 (also known as the accident prevention requirements) are another attempt to bridge the regulatory gaps between worker, public and environmental health, an attempt that promises to be more effective than TSCA.

The Act requires EPA and the Secretary of Labor to promulgate regulations for the prevention and detection of and response to accidental releases of regulated substances. OSA issued its on-site worker-protection rule on process management on February 24, 1992. EPA is required to promulgate its regulation for off-site protection by November 15, 1993, and the agency expects to come close to meeting the deadline.

One of the law's requirements is that owners and operators have to draw up accident prevention plans, including a hazard assessment with "an estimate of potential release quantities and a determination of downwind effects, including potential exposures to affected populations." OSHA's PSM requirements call for a similar Process Hazard Analysis (PHA).

PSM offers an unprecedented opportunity for EPA to implement the pollution prevention philosophy it has paid lip service to for the past decade. But unfortunately, EPA is planning to slip risk assessment even into the otherwise straightforward pollution prevention mandate of PSM planning. Rather than simply requiring implementation of reduction strategies like those companies are already required to identify under the Pollution Prevention Act of 1990, EPA is apparently going to condition the stringency of its PSM requirements on determination of potential "worst off-site consequence" of a release. The agency's draft rule will require that PSM plans include some description of a "credible worst case scenario," thus opening to the vagaries of yet another risk assessment procedure that could otherwise be a relatively simple technological means for racheting down.

Since the Council on Environmental Quality under President Reagan got rid of the previously-accepted definition of worst-case analysis for NEPA purposes, and President Clinton has abolished the CEQ itself, whatever the final language is, it will be important not only in these air toxics rules, but wherever risk assessment is done, so a great deal depends on how the agency ends up defining "worst off-site consequence."

Hopefully, whatever else the PSM rules do, they will require at least some demonstration of pollution prevention at every step in the process.

### ***New Partnerships***

In closing, I'd like to return to the main theme of this conference, and talk for a moment about forging new partnerships. Although I haven't mentioned it, it should not go without saying that local and regional transboundary partnerships such as those forged over the past couple of years among NGOs, academics and governments in the Arizona-Sonora border area, are vital.

Obviously, most of what I've focused on in my talk is linkages between environmental and occupational health. I've also suggested that we need to develop better partnerships between the public (including workers) and health professionals. One legislative opportunity that I haven't said much about is the *OSHA Reform Act*, which is moving fairly rapidly through Congress. There are three or four aspects of that bill which are particularly relevant to our discussion.

First, I would hope that Congress will restore OSHA's PELs so the agency can resume protecting workers against air toxics. Not only should they be restored, but the agency should be given the ability to speed up the standards-setting process.

Second, I would hope that Congress takes this opportunity to expand the lists of 100 or so chemicals requiring hazard analysis under OSHA's and EPA's PSM regulations.

Third, I hope that Congress will require that workers be given increased training in toxics use

reduction and a greater role in on-site health and safety oversight, including the development of PSM plans. The best way to achieve real pollution prevention is to put it in the hands of people who know the workplace environment and are most directly affected by exposure. Hopefully the reauthorized U.S. law will bring this country up to at least the level of worker participation enjoyed by workers under Mexican law.

Finally, I would hope that somewhere in the *OSHA Reform Act* or the *Superfund Reauthorization Act* or elsewhere, Congress takes some decisive action to establish clinics in our communities and workplaces and increased training of health professionals so they are better able to recognize and treat toxic problems. Ongoing surveillance and preventative guidance is a chronic need that will continue even if we were to get rid of risk assessment and start practicing pollution prevention tomorrow. In the short and long run, there is probably no more important step we can take to prevent disease, than bringing well-trained and well-funded health personnel into our communities and workplaces.

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## **The Need for a Pollution Prevention Approach: NGO Working Group Statement on Toxics (1994)**

Michael Gregory and the NGO Working Group, submitted to the Commission on Sustainable Development, New York, United Nations (16-20 May 1994)

### **General:**

Although Chapter 19 of Agenda 21 identified six programme areas for action on toxic chemicals, international organizations, governments and transnational corporations have focused almost exclusively on only the first two, those having to do with risk assessment and the harmonization of nomenclature.

Similarly, although Chapter 20 of Agenda 21 identified four main action areas on hazardous waste, governments, corporations and international entities have focused narrowly on only one, "promoting and strengthening international cooperation in the management of transboundary movements of hazardous wastes."

While these programme areas which have received official attention are important, they are, for the most part, areas that deal with end-of-pipe issues which arise largely because insufficient attention has been and is being paid to the earlier parts of the toxic chemical cycle.

In addition, we note that although there are more than 100,000 chemicals in commerce, only about 1500 account for some 95% of production and even fewer account for most of the problems associated with toxics use. These are not unmanageable numbers or insurmountable problems, but they cannot be addressed effectively through the one-chemical-at-a-time approach which governments and industries continue to favor. Rather, attention must be paid to classes of toxics which present similar toxic properties.

Furthermore, while it is well known that the production, processing, use and disposal of toxic chemicals and waste lead to significant environmental and social problems, national reports and the Secretariat's summary report do not identify the conditions and institutions which lead to unsustainable dependence on these chemical substances.

The following recommendations seek to refocus the attention from costly end-of-pipe matters such as risk assessment and waste management to more fundamental, and more sustainable, mechanisms for preventing production and use of toxics (including chemical, biological and radiological substances) in the first place.

In addition, these recommendations emphasize the essential need for nations, corporations and international institutions, in their programs for dealing with toxics, to more fully incorporate such essential elements of sustainability as grassroots citizen participation and citizen Right-to-Know.

Finally, in order that nations' progress toward implementation of Agenda 21 may be adequately measured, these recommendations call upon the CSD to identify indicators of toxics production, use, transport and release.

### **Chapter 19 Programme Area 1 - International Cooperation**

## **A. Expanding and accelerating international assessment of chemical risks**

### ***Recommendations:***

While recognizing that toxicological and epidemiological evaluation of chemicals is a vital component of regulation, we note that identification of intrinsic hazards is in many cases a better instrument for setting action priorities than qualitative risk assessments which are (a) inevitably inaccurate; (b) subject to a great many assumptions and political persuasions; (c) frequently depend upon such complex procedures that they are of no practical use in the cleaning up or prevention of environmental contamination and exposure of living organisms; (d) dedicated to an unreasonable one-chemical-at-a-time approach which must delay such clean-up and prevention; and (e) typically in service to goals that are contrary to the goals of prevention.

Rather than asking, as risk assessment does, how much production and release of persistent and bioaccumulative toxics can we get away with, we should be asking how much use, release and exposure can we prevent.

*Therefore, it is recommended that:*

While actively encouraging governments and institutions to replace risk assessment with prevention strategies, the CSD should also encourage governments and international bodies engaged in chemical testing to:

- (1) Give priority to testing of broad classes of toxics such as ozone-depleters, endocrine-disrupters, organochlorines and organophosphates; and
- (2) Give priority to testing for developmental, neurological, reproductive, immunological, ecological and other non-cancer effects; and
- (3) Give greater attention to effects of low dose exposure and multiple source exposure (including chemical mixtures), and to cumulative effects from the whole life cycle of toxic products.

## **B. Harmonization of classification and labeling of chemicals**

### ***Recommendations:***

While we recognize the importance of standardized nomenclature, especially in regard to the regulating of international traffic in toxics, it is recommended that:

- (1) Such efforts do not obviate the need for, and should not be carried out at the expense of efforts to reduce, and wherever feasible eliminate the production, release, transport and other use of toxics; and
- (2) Priority should be given to establishing criteria for developmental, neurological, reproductive, immunological, ecological and other non-cancer effects of toxics throughout their lifecycle.

## **C. Information exchange on toxic chemicals**

### ***Recommendations:***

Information exchange on toxics, while not sufficient *per se*, is an essential component of all programs leading towards sustainability. Properly understood, information exchange includes such activities as public education, worker and responder training, the transparency of organizations' operations, and other such variants of disclosure as are generally grouped within the basic democratic principle of Right-to-Know.

*Therefore, it is recommended that:*

(1) The CSD strongly promote the establishment in all nations of effective toxics reporting systems and inventories; and

(a) Strongly encourage nations to include in such inventories, monitoring and mass balance data on the full range of toxics, including all those identified in the UNEP International Register of Potentially Toxic Chemicals (IRPTC), the European Community's EUCLID database, the USA's Toxic Substances Control Act and Hazard Communication Standard lists; and Canada's Workplace Hazardous Materials Information System list; and

(b) Strongly encourage nations to include in such inventories, data from all industrial and governmental sectors with the potential to generate, store, process, release, distribute, dispose or otherwise use such toxics; and

(c) Strongly encourage establishment of international minimum standards for collection, presentation and dissemination of such data, including guidelines for full grassroots participation in all phases of the process; and

(2) In order to assure meaningful informed participation in Right-to-Know processes, the CSD should establish or actively seek to have established within a sister UN agency, a clearinghouse of information on toxics which will make accessible to the public (electronically and in hard copy) such relevant lists, studies and other documents as are produced by international organizations, governments, industries and major groups (e.g., IPCS criteria documents, IRPTC lists, EUCLID data, US-EPA water quality criteria, etc.); and

(3) The CSD should actively promote transparency and grassroots participation within all international organizations, governments and transnational corporations with regard production, storage, release, processing, distribution, disposal and other use of toxics; and

(4) The CSD should actively seek to make the FAO/UNEP Prior Informed Consent guidelines legally binding; and

(5) In order to evaluate progress towards implementation of Right-to-Know, the CSD should establish criteria and programs to monitor the following indicators:

(a) The successful development and implementation of effective inventories in nations throughout the world; and

(b) The development and implementation of effective mechanisms for transparency and grassroots participation in international organizations (including trade organizations), governments and transnational corporations; and

(c) The effective implementation of PIC in all nations.

#### **D. Establishment of risk reduction programmes**

##### ***Recommendations:***

Toxics are a health issues, affecting both human and ecosystem health. As has been repeatedly pointed out by the US-Canada International Joint Commission and others, the only way to prevent exposure to certain classes of toxics (for instance, those like PCBs, DDT, dioxin that are persistent and bioaccumulative and cannot be controlled once they are manufactured) is to prevent production.

Insofar as it has not entailed efforts to achieve effective Pollution Prevention—the avoidance of production and use of persistent, bioaccumulative chemicals, the emphasis international organizations, governments, transnational corporations and industries on reduction of risk has been misplaced.

Risk reduction, as typically practiced, depends on risk assessment; but, due to inevitable uncertainties of even the best science, and to the vagaries of politics, emphasis must be placed not simply on identification, evaluation and mitigation of risks, but on preventing pollution, exposure and disease. We clearly cannot prevent all risks, but we should seek to prevent those which are unnecessary and avoidable.

*Therefore, it is recommended that:*

(1) The CSD encourage development and implementation of such precautionary initiatives as the Montreal Protocol, the OECD pilot project (which has recently expanded its risk reduction focus to include risk prevention), the 1993 ILO convention on prevention of major industrial accidents, the UNIDO and UN/ECE programmes to provide information on cleaner production, and other such programs as develop and transfer toxics use reduction and other preventative technologies; and

(2) The CSD actively promote international and national programmes to phase out the generation, use and export of all persistent, bioaccumulative toxics, including, in the short term:

(a) Leaded gasoline and lead-containing paints, which are recognized as highly toxic products with intrinsic deleterious effects even at low levels of exposure;

(b) chlorinated compounds such as dioxins which are commonly found in fatty tissues and mothers' milk, and are produced by such industries as pulp and paper processing and by unsustainable incineration of wastes;

(c) Methyl bromide, a highly toxic pesticide which presents unacceptable risks to the public, to agricultural workers and to the ozone layer; and

(3) The CSD actively promote development and implementation of international criteria and mechanisms to give preference in trade to traffic in non-toxic or least-toxic products and processes; and

(4) As indicators of progress in implementation of such programs, the CSD establish criteria for and track:

(a) The elimination of classes of unacceptable chemicals such as CFCs (identified under the Montreal Protocol), organophosphate pesticides (targeted under the Barcelona Convention), and others such as persistent, bioaccumulative metals and organochlorine compounds (targeted by the US-Canada International Joint Commission and others); and

(b) The reduction in generation of toxics (including toxic, radioactive and hazardous waste) on a nation-by-nation basis; and

(c) The reduction in international traffic of toxics (including toxic, radioactive and hazardous waste);

(d) The reduction in releases of toxics to the environment (whether as waste by-products or incorporated in primary products of commerce).

## **E. Strengthening of national capabilities and capacities for management of chemicals**

### ***Recommendations:***

Since governments and NGOs, especially in developing and recently-developed countries, often lack technical and financial resources to assure proper management of toxics and effective participation of the grassroots in toxics decision-making, it is recommended that:

(1) The CSD encourage implementation of the Precautionary Principle and the principles of Polluter Pays and Potential Polluter Pays, by actively assisting governments to:

(a) Eliminate subsidies for toxic products and processes, beginning with those for which there are known non-toxic, economically feasible alternatives; and

(b) Establish financial incentives for clean production and processes; and

(2) The CSD should actively encourage expansion of training programs for identification and reporting of toxics generation, release and other use of toxics, and for effective response to accidents and other catastrophic toxics incidents, including such existing programs as those carried out by UNITAR, UNIDO, UNEP and the UN Centre for Urgent Environmental Assistance; and

(3) The CSD should take the lead within the international community to design systems for regulating Transnational Corporations (TNCs) to assure development and deployment of least-toxic products and technologies, including incorporation of full-cost accounting into all pricing systems; and

(4) The CSD should establish guidelines for disclosure and mechanisms to disseminate reports for TNCs regarding their toxics production, consumption, release, disposal and other use; and

(5) The CSD should encourage and help nations to gain and channel funds from development revenues into effective regulatory programs for toxics reduction and control, including training programs for technical assistance in prevention technology and for the identification and effective clean-up of existing hazardous waste sites.

## **F. Prevention of illegal international traffic in toxic and dangerous products**

*It is recommended that:*

(1) The CSD should actively seek to achieve a legally-binding international ban on traffic in toxics (including pesticides) that are banned, withdrawn, severely restricted, or unapproved for use in the country of origin; and

(2) In order to evaluate implementation of such bans, the CSD should establish criteria and programs to monitor:

(a) Implementation of the Basel Convention, including requirements that nations guarantee sound management of wastes in countries to which they export;

## **G. New initiatives**

### ***Recommendations:***

As has been widely recognized, NGOs play a vital role in development of informational processes in regard to toxics, including the effective transformation of information into public evaluation and action. It has also been widely recognized that there is a continuing need for strong on-the-ground connections between governments and their citizens, and that democratic participation is a basic principle of sustainability.

*Therefore, it is recommended that:*

(1) The CSD actively seek to assure that funding be made available to secure informed and otherwise effective participation of grassroots citizens organizations in all phases of CSD-related activities, including CSD meetings, intersessional meetings, and other activities of governments and international organizations pertinent to the purposes of the CSD.

## **Cochise County-Northeast Sonora Border 21 Planning Project (1995)**

Michael Gregory (1995)

### ***Project summary***

The goal of this project is to facilitate binational cooperation among parties in the Northeastern Sonora/Cochise County area in order to enhance the capacity of local governmental and non-governmental entities to:

- Participate effectively in the 5-year planning process of the Border 2000 program
- Develop land-use plans which address increased transboundary traffic, usage and storage of hazardous materials in the project area resulting from the economic integration pursuant to NAFTA
- Facilitate binational public participation in regional decision-making
- Strengthen existing and develop additional bases for future crossborder coordination of community environmental planning

### ***Background***

Bordered on the east by the state of New Mexico and on the south by the state of Sonora, Cochise County has a population of 103,000, some 29% of which is of Spanish heritage. The three largest cities are Sierra Vista (pop. 34000, 30 miles from the border), Bisbee (the county seat, pop. 6500, 5 miles from the border) and Douglas (pop. 15000). Douglas and Naco (25 miles to the west, pop. 1000) lie directly on the border, adjacent to their Sonoran sister cities, Agua Prieta (pop. 70-100,000) and Naco (pop. 7000), respectively.

Due to increased transboundary trade, all these border communities are experiencing stress on health and environmental infrastructure and are faced with significant planning and zoning issues. Of particular concern are increased storage, distribution and other use of hazardous materials which enter the area as raw materials, products and wastes. In the recent past, such traffic has resulted in several spills and leaks on both sides of the border, requiring emergency response. This situation has led to several binational training sessions for emergency responders in the area, but there has been no equivalent effort to address hazard prevention and reduction through binational training of community planners.

Until recently, land-use planning in the project area had not begun to address hazardous materials issues adequately, with the result that highly hazardous substances are frequently stored, transported and otherwise used in densely populated and low-income areas, and near schools, hospitals, water supplies and other sensitive locations.

Due to increased flow of hazardous materials in the project area, increased awareness of the hazards presented, and increased public concern voiced by residents, officials in all the area communities have begun to address planning needs for hazard reduction and pollution prevention. In particular, Cochise County, faced with an increasing number of applications for siting of hazardous materials operations, has begun taking steps to relocate existing facilities and transportation routes and to develop planning tools for reducing hazardous materials threats to

the local population and environment.

The principal vehicle for the County's efforts is the Cochise County Comprehensive Plan, which currently is being updated to address hazardous materials issues. At the request of the Cochise County Board of Supervisors, Arizona Toxics Information (ATI) has agreed to work with the County's Planning Department on updating the Plan and related planning and zoning processes in order to identify existing and potential sources of hazardous materials threats and to make recommendations for addressing identified problems.

Given that the greatest potential threats from hazardous materials in the project area are the Agua Prieta *maquiladoras* and transportation routes to and from them (including, i.e., the Douglas and Naco border crossings, which are also subject to increasing amount of traffic to and from mines in Northern Sonora), the County has long recognized (in its Hazardous Materials Emergency Response Plan, for instance) that effective planning requires binational cooperation. Until recently, however, formal mechanisms were not in place to facilitate such needed cooperation. Cross-boundary emergency response, for instance, has largely been carried out, if at all, through informal, ad hoc arrangements between individual fire departments' responders. Land-use planning has generally been subject to even less cooperative attention, and has been carried out on each side of the border with little or no cross-border dialogue between local planners.

Two recent developments offer an opportunity to significantly advance binational cooperation in these matters. First, in the past two years, the Northeast Sonora-Cochise County Health Council (NSCCHC) has become an effective forum for binational discussion of health and environmental issues in the project area. Composed of representatives from governmental and non-governmental organizations on both sides of the border (including municipalities, health departments, environmental groups, etc.), the Council has conducted several successful public forums to educate and involve the local public in identifying and developing local and regional solutions to area health and environmental problems, including issues related to the NAFTA and the Border Environmental Cooperation Commission.

Second, updating of the Cochise County Plan, the upcoming revision of the zoning regulations and the commitment of the County Planning Department to encourage binational cooperation and broader stakeholder participation offer an opportunity to develop both truly comprehensive planning in the County process and solutions to problems that may be transferable to similar situations on the Mexican side of the border. Not only does the County planning process include one of the better existing models for public involvement in the project area, but the existing leadership role of the County's Department of Health Services within the NSCCHC has paved the way for the binational Council to serve as an easily-accessible forum in which planners from both sides of the border can come together to address issues of mutual concern. For instance, the Council has become a recognized vehicle for channeling public concern into local, state, regional and federal needs assessments on both sides of the border, including significant input to the Integrated Border Environmental Plan process.

Arizona Toxics Information and the project manager have extensive experience with successful cross-border cooperative projects in the project area, including co-sponsorship of public issue-identification forums on the EPA-SEDUE Integrated Border Environmental Plan and the recent compilation of an integrated hazardous materials inventory of Agua Prieta *maquiladoras*. At the request of the Cochise County Board of Supervisors, they have also cooperated with the County Planning Department and the LEPC on hazardous materials planning issues regarding specific sites and facilities. The current proposal is to take the first steps toward extending those previous successful linkages into the field of comprehensive binational planning.

### ***Project description and products***

Working in cooperation with the County of Cochise Planning Department and the Local Emergency Planning Committee, as well as planners from the communities of Agua Prieta and Naco, Sonora, ATI proposes to implement the project and develop the following products in four steps:

#### Step 1.

**Through the NSCCHC, in order to enhance the Sister City and Border 2000 planning processes, ATI will facilitate crossborder dialogue of planners from Cochise County and appropriate US communities (Douglas, Naco, Sierra Vista, etc.) with planners from the State of Sonora northeastern regional planning district and associated Mexican communities (Agua Prieta, Cananea, Naco, etc).**

There are a significant number of planning issues of mutual concern in the project area, which present potential points of discussion and cooperation between planners on both sides of the border. These issues include :

- siting of new developments and relocation of existing operations such as solid waste dumps, hazardous materials import/export storage and transfer facilities, maquiladoras and residential subdivisions
- transportation routes, including trucking of hazardous waste and other hazardous materials, e.g. the possibility of a new transportation corridor from Cananea-Sierra Vista is under consideration, as is rerouting of traffic to the Naco border crossing; increased crossborder transportation of hazardous mining materials to and from the Cananea mine has created serious concern
- wastewater treatment, including current proposals for development of a wastewater treatment plant in Naco, Sonora with potential transboundary impacts
- surface water issues, including transboundary as well as domestic waters; e.g. flood control, wetlands preservation and development, impacts on the Rio San Pedro/Rio Sonora watersheds from mining in Cananea and Bisbee areas as well as over-consumption of water in the Sierra Vista urban area;
- groundwater issues including overpumping of the shared aquifer and potential contamination from mining and other industrial development
- air quality issues, including transboundary dust from unpaved roads, toxic chemical pollution from increased transboundary traffic and industrial development, burning waste dumps in Naco and Agua Prieta
- potential development and enhancement of recreational and resource conservation areas, such as parks, border greenbelts, wildlife management areas etc.
- increasing transboundary and area railroad traffic, including shipments and potential spills of highly hazardous materials

Presently, there is little or no crossborder dialogue about these issues of mutual concern and no

mechanisms to facilitate such dialogue. Planners on both sides lack knowledge about the other side's responsible entities, planning and zoning procedures, and long-term planning strategies.

ATI would schedule a series of meetings and workshops, hosted by the NSCCHC, bringing planners together in order to facilitate information exchange, technology transfer and possible future cooperation. Although it is impossible in advance to predict exactly what course such cooperation might take, preliminary discussions with planners on both sides of the border have indicated that the meetings would likely progress in a stepwise fashion such as the following:

1. identifying areas of mutual concern. including
  - defining basic terms, clarifying language difficulties
  - establishing a geographic area of mutual concern (for instance, the 100 km border zone established by the La Paz Agreement, or appropriate jurisdictional boundaries)
2. familiarizing each side with the other's institutions, responsibilities, procedures and capabilities and developing joint comparisons of planning mechanisms, instruments and strategies (e.g. hazard and environmental impact analysis, compliance review and enforcement, the Cochise County Comprehensive Plan and the Plan Estatal de Desarrollo).
3. identifying potential future cooperative activities, which, among others, could include
  - creating a binational, inter-governmental notification/advisory process for development impacting the border zone
  - facilitating binational public notification and participation processes for such development
  - establishing mechanisms for binational environmental assessments
  - providing for long-term communication mechanisms in order to achieve jointly planned development
  - planning for human, technical and financial resource sharing

Among other technical supports, ATI (at one of the early meetings) will provide for a demonstration and analysis of data tracking systems and throughout the process will provide Spanish and English translations of relevant documents to meeting participants and other planners on both sides of the border. Potential participants identified to date include representatives and staff from the following agencies: COPLADES (Comité de Planeación del Desarrollo del Estado de Sonora); COPLAM (Comité de Planeación Municipal) de Agua Prieta, Naco, Nacozari, and Cananea; Protección Civil; Cochise County, Bisbee and Douglas Planning Department; Cochise County Department of Economic Development; Flood Control District; Cochise County Division of Emergency Planning; Cochise County Local Emergency Planning Committee, Cochise County Department of Health Services.

### Step 2.

**Concurrently with binational activities in Step 1, ATI will provide technical expertise to the**

**County Planning Department for both the updating of the Cochise County Comprehensive Plan and the revision of the zoning regulations.**

Since its inception, ATI has been involved in a variety of hazardous materials storage, transport and processing issues at local, national and international levels and has acquired considerable experience in developing public participation procedures for hazardous materials management. Locally, ATI has actively participated over the past several years in a variety of public hearings, workshops, seminars and other meetings in the project area addressing hazardous materials management. Drawing upon this background experience and through review and analysis of the results of these meetings, as well as through consultation with area planners, ATI will work closely with and provide technical support to the County Planning Department on:

- identification of hazardous materials zoning and permitting issues
- identification of priority local needs for planning in regard to existing and potential hazardous materials sources in the project area
- identification of criteria and options for siting of hazardous materials storage, transport and processing operations
- identification of opportunities for strengthening public participation, particularly binational participation, in the planning and zoning process
- development of procedures for the processing of special use, commercial permit and rezoning applications (any of which may be required for proposed developments involving potentially significant adverse environmental and health impacts), including mechanisms for facilitating binational public notification and participation in the review of such applications.

Step 3.

**In cooperation with the County Planning Department and the planners in Mexico, ATI will develop, from the products of Step 1 and 2, recommendations to the County Board of Supervisors for incorporating essential elements of community and environmental health protection into the county's Comprehensive Plan and related zoning processes, including**

- policies that take into account the need for binational cooperation in planning and zoning
- policies regarding the siting and permitting of hazardous materials operations
- processes for incorporating technical review, public notification and participation in the evaluation of zoning, special use permits and commercial permits for facilities and operations which store, distribute or otherwise use hazardous materials
- hazardous materials data tracking systems appropriate to the County

Step 4.

**ATI will present a final documentation of the project in English and Spanish which may be used by entities in other border areas as a model for the incorporation of environmental**

**and health issues linked to hazardous materials into Comprehensive Planning.**

## **Proyecto de Planeación para la Región Noreste de Sonora/Condado de Cochise (1995)**

Michael Gregory (1995)

### ***Resumen del Proyecto***

La meta de este proyecto es para facilitar la cooperación binacional entre grupos en la región Noreste de Sonora/Condado de Cochise para mejorar la capacidad de entidades gubernamentales y no gubernamentales a:

- Participar efectivamente en el proceso de planeación para el programa Frontera 2000
- Desarrollar planes para el uso del suelo los cuales tomen en cuenta el creciente uso, almacenamiento y tráfico transfronterizo de materiales peligrosos en la región, debido a la integración económica siguiente al TLC
- Facilitar la participación pública binacional en las decisiones regionales
- Reforzar fundamentos existentes y desarrollar fundamentos adicionales para la coordinación transfronteriza de la planeación ambiental de las comunidades en el futuro

### ***Antecedentes***

Debido al comercio creciente, las infraestructuras de salud y ambiente de todas las comunidades fronterizas en la región están sobre tensiones y son enfrentadas con cuestiones serias de planeación y uso del suelo. Entre estas son de mayor importancia los problemas del creciente almacenamiento y la distribución de los materiales peligrosos, que entran la región en la forma de materiales crudos, productos y desechos. Recientemente, este tráfico ha resultado en varios derrames en ambos lados de la frontera, necesitando respuesta de emergencia. Esta situación ha causado varios seminarios binacionales de educación para los grupos de respuesta de emergencia, pero hasta hoy no ha habido esfuerzos binacionales para la prevención y reducción de peligros a través de educación de los oficiales y empleados de agencias de planeación.

Hasta recientemente, la planeación del uso de suelo en la región no ha empezado a tomar en cuenta los materiales peligrosos, resultando en el almacenamiento, uso y transportación de estos materiales en áreas de población densas cerca de escuelas, hospitales, recursos de agua y otros lugares sensibles.

Debido al tráfico creciente de materiales peligrosos en la región y al conocimiento de los peligros y la preocupación de los residentes, algunos oficiales en las comunidades de la región han empezado a preocuparse con las necesidades de planeación para prevenir y reducir peligros. Particularmente el Condado de Cochise, mirando a muchas solicitudes de uso de suelo de empresas que manejan materiales peligrosos, ha empezado acciones para cambiar los sitios y las rutas de transportación y para desarrollar instrumentos de planeación los cuales reduzcan los peligros para la población y el medio ambiente.

El mayor instrumento en los esfuerzos del Condado de Cochise es el Plan Comprensivo del Condado de Cochise, el cual en el presente está siendo actualizado para incluir las cuestiones de materiales peligrosos. El Departamento de Planeación del Condado de Cochise ha pedido a

Arizona Toxics Information que asista en el proceso de actualización del Plan y otros mecanismos relacionados a la planeación y uso del suelo para identificar posibles fuentes de materiales peligrosos y para hacer recomendaciones de como ocuparse de los problemas identificados.

Dado que las más grandes amenazas potenciales de materiales peligrosos son las maquiladoras y las rutas de transportación de ellas (incluyendo los puertos de entrada de Douglas/Agua Prieta y Naco/Naco, los cuales están sujetas de trafico creciente de las minas en Sonora), el Condado de Cochise reconoció (por ejemplo en su Plan de Emergencia) la importancia de cooperación binacional para un proceso de planeación efectivo. Hasta hoy, no existen mecanismos formales para facilitar esta cooperación. La planeación para respuesta de emergencia, por ejemplo, se manejó mediante acuerdos informales entre oficiales en los departamentos de bomberos. En términos de ordenamiento territorial, los oficiales pertinentes no se ocuparon del todo de cooperación binacional, y los procesos de planeación se manejaron con poco o nada de diálogo transfronterizo.

Hay dos procesos recientes que ofrecen la oportunidad de avanzar la cooperación binacional en temas de planeación y materiales peligrosos. Primero, el CSNSCC (Consejo de Salud del Noreste de Sonora y el Condado de Cochise) en los dos años pasados, ha llegó a ser un foro efectivo para el diálogo sobre temas de salud y ambiente. Segundo, el proceso de actualización del Plan Comprensivo ha demostrado la dedicación del Condado para verdaderamente incluir mecanismos para la participación pública y cooperación binacional en sus regulaciones actualizadas.

Arizona Toxics Information y el administrador del proyecto tienen experiencias vastas con proyectos de cooperación transfronteriza. Hemos trabajado con el Condado y el LEPC en cuestiones de planeación relacionadas a sitios específicos. El proyecto, financiado para el Programa Frontera 2000 de la EPA, representa los primeros pasos para integrar todas las acciones mencionados para llegar a una planeación verdaderamente comprensiva y binacional.

### ***Descripción del Proyecto***

Trabajando en cooperación con el Departamento de Planeación del Condado de Cochise, el LEPC, y los Departamentos de Planeación del Noreste de Sonora, especialmente de Agua Prieta y Naco, vamos a implementar el proyecto y desarrollar los productos siguientes en cuatro pasos:

#### **Paso 1**

**A través del CSNSCC, para avanzar los procesos de "Ciudades Hermanas" y "Frontera 2000", ATI va a facilitar el diálogo transfronterizo entre oficiales de planeación del Condado de Cochise, las comunidades pertinentes en Arizona (Douglas, Naco, Sierra Vista, Bisbee) y oficiales de planeación del Noreste de Sonora (Region 4 COPLADES [Comité de Planeación del Desarrollo del Estado de Sonora]) y los comunidades pertinentes en Sonora (Agua Prieta, Cananea, Naco)**

Hay varios temas significantes de planeación que son de interés mutuo en la región y que representan posibles puntos para la discusión y cooperación entre los oficiales de planeación de ambos lados, incluyendo:

- la ubicación [siting] de nuevos proyectos de desarrollo y la relocalización de operaciones existentes, tal como rellenos sanitarios de materiales peligrosos, facilidades de traslado y almacenamiento de materiales peligrosos, maquiladoras y nuevas zonas de residenciales.

- rutas de transportación, incluyendo transporte de desechos tóxicos y otros materiales peligrosos, por ejemplo se está considerando la dirección de tráfico al puerto de Naco y el creciente transporte de materiales peligrosos de la mina en Cananea.
- tratamiento y uso de aguas residuales, incluyendo propuestas recientes para ampliar el sistema de tratamiento de aguas residuales en Naco, Sonora con posibles impactos transfronterizos, y de utilizar aguas negras de Douglas para rociar las calles no pavimentadas en Agua Prieta.
- temas de aguas superficiales, transfronterizos y nacionales, como preservación y desarrollo de [wetlands], control de inundación, impactos de las minas de Cananea y Bisbee sobre el Río San Pedro/Río Sonora y sobreconsumo de aguas en la región urbana de Sierra Vista
- temas de aguas subterráneos, como la sobre explotación del acuífero común y la posible contaminación causada por la minería y otras operaciones industriales
- temas de calidad de aire, como polvo causado por las calles no pavimentadas, aire contaminado por emisiones de tráfico e industria, vaciaderos municipales quemados en Naco y Agua Prieta
- posible desarrollo y avance de zonas de recreación y preservación, tal como parques, cinturones verdes fronterizos, manejo de fauna, etc.
- creciente tráfico del ferrocarril, el cual incluye transporte de materiales peligrosos y posibles derramamientos subsiguientes

En el presente, no hay un diálogo transfronterizo sobre estos temas de interés mutuo y no hay mecanismos para facilitar tal diálogo. Oficiales en ambos lados carecen del conocimiento de las entidades, de los instrumentos y estrategias a largo plazo del otro lado.

ATI establecerá una serie de reuniones y seminarios, presentados por el CSNSCC, y reunirá a oficiales para facilitar el intercambio de informaciones, la transferencia de tecnología y posible cooperación en el futuro. Aunque parece imposible predecir exactamente el carácter de tal cooperación, discusiones preliminares con los oficiales de ambos lados indicaron que las reuniones probablemente se desarrollarán de la siguiente manera:

#### 1. Identificar áreas de preocupación mutua

- definir términos básicos, clarificar dificultades del idioma
- establecer una área geográfica de preocupación mutua (por ejemplo, la zona fronteriza de 100 km establecida por el Acuerdo de La Paz, u otros límites jurisdiccionales apropiados)

2. Familiarizar a cada lado con las instituciones, responsabilidades, procedimientos y capacidades del otro lado y desarrollar comparaciones de los mecanismos, instrumentos y estrategias de planeación (por ejemplo análisis de riesgo y análisis de impacto ambiental, control de cumplimiento, el Cochise County Comprehensive Plan y el Plan Estatal de Desarrollo).

3. Identificar actividades potenciales cooperativas en el futuro, que, entre otras, podrían incluir

- crear un proceso de notificación y consulta binacional entre las entidades gubernamentales para desarrollos y decisiones que afectan la zona fronteriza
- facilitar procesos binacionales de notificación y participación pública por tales decisiones
- establecer mecanismos binacionales para hacer evaluaciones ambientales (EIS)
- proveer por mecanismos de comunicación a largo plazo para alcanzar un desarrollo planeado conjuntamente
- planeación para compartir recursos humanos, técnicos y financieros

Entre otros apoyos técnicos, ATI (en una de las primeras reuniones) proveerá por una demostración y análisis de sistemas de datos. En todo el proceso proveerá traducciones en español e inglés de documentos pertinentes a participantes de la reunión y otros oficiales en ambos lados de la frontera. Participantes potenciales identificados incluyen a representantes y empleados de las agencias siguientes: COPLADES; COPLAM (Comité de Planeación Municipal) de Agua Prieta, Naco, Nacozari, y Cananea; Protección Civil; Cochise County, Bisbee y Douglas Planning Department; Cochise County Department of Economic Development; Flood Control District; Cochise County Division of Emergency Planning; Cochise County Local Emergency Planning Committee, Cochise County Department of Health Services.

**Paso 2**

**Simultáneamente con las actividades binacionales en Paso 1, ATI proveerá conocimiento técnico al Departamento de la Planeación del Condado por la actualización del Cochise County Comprehensive Plan y la revisión de las regulaciones del uso del suelo y determinar zonas (habitacional, comercio, industria, etc.).**

**Paso 3**

**En cooperación con el Departamento de la Planeación del Condado y los oficiales de planeación en México, ATI desarrollará, de los productos de los Pasos 1 y 2, recomendaciones para el Consejo de Supervisores del Condado de Cochise para incorporar elementos esenciales de protección de la comunidad y de la salud ambiental en el Plan Comprensivo y en los procesos de determinación de zonas para uso de suelo [zoning] relacionados incluyendo:**

- políticas que tienen en cuenta la necesidad por la cooperación binacional en planeación y determinación de zonas para uso de suelo [zoning]
- políticas con respecto a procesos de permisos [permitting] y ubicación [siting] de operaciones que manejan materiales peligrosos
- procesos para incorporar repasos técnicos, participación y notificación pública en

la evaluación de la determinación de zonas [zoning], permisos de uso especial y permisos comerciales para tales operaciones

- sistemas de datos apropiados para el Condado y el Municipio para rastrear los materiales peligrosos

**Paso 4**

ATI presentará documentación conclusiva del proyecto en inglés y español la cual puede ser usada por entidades en otros áreas de la frontera como un modelo para la incorporación de temas de ambiente y de salud relacionadas a los materiales peligrosos en Planeación Comprensiva.

## **Introductory Remarks to the Workshop: Integrated Hazardous Materials Tracking for Land Use Planning and Pollution Prevention (1996)**

Michael Gregory, Sierra Vista, Arizona (7 May 1996)

ATI is a non-profit environmental advocacy and policy organization based in Bisbee, Arizona that addresses a wide range of toxics-related issues locally as well as nationally, binationally and internationally. Our mission focuses in particular on advocacy for 1) community and worker right to know, 2) pollution prevention, and 3) public/social participation in decisions that affect our lives, especially in regard to issues involving *hazardous materials*, a term we define broadly to include all aspects of pollution and potential exposure—emergency as well as routine releases (including emissions to air, discharges to water, transfers to land and landfills, and incorporation in products); hazardous waste generation, storage, treatment and disposal; pesticide application and residues; workplace health and safety, etc.

We try to carry out our mission through a variety of means, one of the most important of which we think is acting as a technical resource to help build the capacity of citizens groups and local governments in small communities on the border to address the complex of issues that typical surround hazardous materials management and regulation.

In this regard, in 1995 we applied for and received a small Border 21 grant from the US EPA to facilitate binational dialogue between land-use planners from northeastern Sonora and Southeastern Arizona on 1) issues of mutual concern in general, and in particular on 2) land-use planning as a potential tool for pollution prevention in the Mexico-US border region.

One need, made even more apparent by the workshops that have already taken place, is for basic tools to manage the many kinds of hazardous materials data and information that come at planners from many different sources and directions—so that hazardous materials in the community can be identified, characterized and tracked for a variety of purposes including land-use planning and zoning; site, facility and activity permitting; public health and environmental protection; occupational health and safety; and for emergency planning and response—an area of special concern for many citizens and, of course, for many of you here today.

Information management is a basic component of planning. The first step in formal emergency planning for hazardous materials is hazard identification and, to say something very similar in slightly different words, the first step in pollution prevention is the right to know, the right of the public to access information. As the United States experience has shown in the past few years, information itself is a very powerful tool for achieving these ends; the single most effective means to pollution prevention in the US has been the simple disclosure to the public under the *1986 Community Right to Know Act* of what hazardous chemicals are used by the industries in our communities.

Yet for local governments and agencies, effective planning—both land-use planning and emergency planning—requires several actions beyond that initial hazard identification step, actions to actually *implement* means for public access to hazmat information and *implement* measures for pollution prevention. Community planners and regulators need tools to organize the wide variety of hazmat data they receive and to incorporate it into their general planning processes and harmonize it with the various regulations they administer and with the various obligations they have to state and federal governments as well as to the general public.

Furthermore, planners must consider not just emergency releases of hazardous substances due to

fires, leaks, spills and other accidents, but routine and planned releases from industrial, residential and civic facilities—including emissions to the air, discharges to water, and disposal to the land surface and landfills. And while many different rules and regulations concerning hazardous materials are administered by many different agencies and regulatory bodies in each country (and sometimes jointly by both countries), at ground level, where we all live and work and play, we ultimately rely on local planners to arrange things to protect from the hazardous materials that we use and discard. Planners, in other words, have to consider not only pollution prevention but the closely related issue of disease prevention.

This is why we speak not just of data management, but integrated data management—a system that tracks the multiple sources of actual and potential, human and environmental exposures from the hazardous materials in our communities.

And that is why we have invited John Gardiner and Eric Hutchins to speak with us today. Both John and Eric have considerable hands-on experience in developing Hazardous Materials Information Systems for small communities like ours here on the border. They will be focusing on two different systems, both of which are in use in different US communities, both of which can be easily adapted to fit specific community needs.

Both will use hazardous materials emergency planning as the focal point of their presentations, but both will move beyond that specific focus to address community hazardous materials information management planning in general. We're going to have a very informative afternoon, and I know there will be a lot of questions and discussion following each speaker's presentation.

In order to make sure that we get in as much interchange as possible, and to make sure that Eric makes his plane flight, we'd like to adhere closely to the following schedule. John will speak first, followed by 10-15 minutes of questions and answers. Then we'll take a short 15-minute break, after which Eric will give his presentation, followed again by 10-15 minutes of questions and answers. Then, we'll open it up to questions for either speaker, so that you can ask John questions you didn't get a chance to ask before the break.

One word of caution before we start. Many of the terms you will hear today are highly technical terms, sometimes with very special legal meanings. For the most part, especially since both our speakers are from the US and most familiar with US laws and procedures, the terms will be those in use on this country. Often there are no standard equivalent terms in Spanish; or the Spanish equivalents are equally as technical or uncommon; or the choice between various Spanish terms is not clear (so, for instance, one interpreter may use one term, another interpreter another).

We have not given our interpreters an easy job today. And they have done an admirable job in the short time we have allowed them to review the materials. And, of course, like some of you, in many cases they will be hearing the terms today for the first time.

So we ask you to listen with understanding, and to help us arrive at the proper terminology when we don't have it. One of the products of this workshop series will be a bilingual glossary of planning terms, and we will be grateful for any help you can give us in making that document most complete and useful. And I would like to take this opportunity to especially remind the participants of the regular workshop series to look again at your copies of the draft glossary and send us your additions and corrections as soon as possible so we can get out a next-to-final draft in time for the June workshop.

## Hazardous Materials Orientation Training Module (1997)

Michael Gregory, prepared for Arizona Division of Emergency Services Workshop, Nogales, Arizona (26 February 1997)

### I. Introduction

#### A. Purpose of this training

##### 1. Topics

- Provide basic vocabulary, concepts, principles and contexts, including elements and issues of regulation
- Examine some of the basic who, what, when, where, why, and how much of toxics
- Indicate the principal authorities, laws and regulations and other forms of toxics management
- Focus especially on **hazard identification, hazard source, hazard fate in the environment**, and to a lesser extent, **hazard effect**
- Discuss some of the basics of toxics **data management** (including information sources)

##### 2. Goal: To provide basis for **integrated hazardous materials planning for land-use and emergency planning**, especially for prevention of disease and pollution

- Emergency planning: prevention/response to accidental/*incidental* releases or *potential* releases
- Land-use planning: prevention/accommodation of uses, taking into account routine/*continuous* releases or conditions or *potential* releases/conditions

#### B. Principles: Internationally-recognized rules of thumb in dealing with toxics

##### 1. **Basic Law of Ecology**: Everything is connected to everything else.

- Corollary #1: Dilution is not the solution to pollution.

##### 2. **The Prudence Principle (= General Rule of Public Health)**: when in doubt, take the more prudent (i.e., more protective) course

- Corollary: The **Precautionary Principle**: “if a chemical or group of chemicals is persistent, toxic and bioaccumulative, we should immediately begin a process to eliminate it. . . whether or not unassailable scientific proof of acute or chronic damage is universally accepted. . . the focus must be on preventing the generation of persistent toxic substances in the

first place, rather than trying to control their use, release, and disposal after they are produced” (International Joint Commission, *Sixth Biennial Report on Great Lakes Water Quality*, April 1992).

3. **Pollution Prevention Principle:** it is better (safer, cheaper) to prevent pollution at the source, before it occurs, than to try to control it at the end of the pipe or to clean it up after it has occurred

4. **Polluter Pays Principle:** those who create pollution should be responsible for cleaning up the pollution (cf. Agenda 21, OECD, IFCS)

- Corollary: By extension, potential polluters have are responsible for preventing the pollution)

5. **Right to Know Principle:** people have a right to know what chemicals are in our communities and workplaces, what their dangers are, and what is being done or can be done to prevent their release (Agenda 21, ILO, OSHA, EPCRA, etc)

## II. Hazard Identification: What and How Much)

- **Hazardous materials/hazmat** = Hazardous substances, extremely hazardous substances, toxic substances, toxic wastes, toxic chemicals, air toxics, dangerous goods, dangerous substances, radioactivity, radioactive wastes, mine wastes, solid wastes, special wastes, water contaminants, air emissions, fire, pesticides, pollutants, criteria pollutants, infectious agents, poisons, toxics, reactive agents, corrosives, sewage, urban run-off, agricultural run-off, etc.

- Each of these terms has a specific legal meaning in the context of one or more laws, but in common speech they are often used interchangeably

- Broadest terms are *pollutants*, *toxics*, *hazardous* materials, and *chemicals*

- ***The Hazardous Materials Universe***

- It has been estimated that there are about 5,000,000 chemicals in the world

- There are somewhere between 100,000 and 1,000,000 in commerce worldwide (probably closer to 100,000; number depends to some extent on how the estimators define the word “chemical” or “substance”)

- Anywhere from 1000 to 2500 new substances are put into commerce every year (probably about 1500 is a good estimate)

- Not just the numbers/amounts, but the rate of increase is also a concern

- E.g., production of one classes of chemicals of particular concern, “synthetic organic chemicals” (including many dyes, plastics, solvents, pharmaceuticals, etc.) has increased more than a thousandfold in the past 50 years or so (from 0.15 billion kg in 1935 to > 150 billion kg in 1995)

- An average of 2-3 new synthetic chemicals are released into the environment every day
- Pesticides (many of which are also synthetic organic compounds) are another example; since and despite Rachel Carson's *Silent Spring* in 1962, US farmers have doubled the amount of pesticides they use, and the number of different kinds of pesticides they use has grown even more
- Rate of generation and proliferation are, in fact, two of the most serious concerns: most of the hazardous materials of concern are relatively new, having been discovered or created only in the past 50-100 years; and the technology of production has far surpassed the development of technical and regulatory tools to protect us from the new toxics in our environment
- Some 50-100,000 are generally recognized as presenting some *hazard* to human health or the environment
- Studies (e.g., OECD) have identified about 1800 of these as the largest volume used in commerce and industry
- US government specifically regulates a few hundred and in general tracks or inventories a few thousand substances
  - The EPA Toxic Substances Inventory of chemicals in commerce in the US contains about 70,000 substances
  - OSHA requires worker notification about products that contain any of about 50,000 hazardous materials (but there is no list of those substances)
  - DOT requires certain handling procedures for about 7,000 substances and mixtures of substances in transportation (including things like oily rags)
  - Environmental media laws require permits for a few hundred substances:
    - E.g., Clean Air Act requires permits for 300 or so Air Toxics, Clean Water Act for a hundred or so Water Pollutants,
    - Hazardous waste require permits for generation, treatment or storage of about 300 substances
  - Certain disclosure or right to know laws require reporting of some substances, including some of the same ones covered under the environmental media laws
    - E.g., Emergency Planning and Community Right to Know Act (EPCRA) requires reporting for emergency planning purposes on about 300 "Extremely Hazardous Substances" and annual release

inventories on about 629 “Toxic Chemicals”

- CERCLA (Superfund) requires reporting of spills and emergency releases of about 1300 hazardous substances

• ***What’s in a Name?*** Identification/terminology is confusing because substances may be named or classified (i.e., identified) on basis of physical form, chemical family or structure, source, location, destiny or fate in the environment, physical or chemical properties, biological or toxicological effect, use or purpose (or lack of it: e.g., “waste”), manufacturer, sales potential (i.e., brand names), common names. . . .

• Best identification is for specific substances and specific facilities: rule of thumb = get as specific as possible

• This is standard chemical name plus standard numeric identifier = IUPAC name (International Union of Pure and Applied Chemists) + CAS (Chemical Abstract Service) registry number

- CAS number is becoming the international standard numeric identifier

- There are other names, usually used because they’re shorter: e.g., RTECS (Registry of Toxic Effects of Chemical Substances: NIOSH), and EPA names are becoming standard—that’s what we use for the ***Cochise County Reference List***

• **Classification Systems/Conventions**

- ***Physical Forms***

- Solids (dusts, powders, particulates, metals, etc.)
- Liquids (acids, sludges)
- Gases and vapors
- Biological agents (bacteria, viruses, pathogens)
- Radiologicals
  - Ionizing (Low-level, High-level, BRC)
    - Natural
      - Cosmic rays
      - Uranium/Radium/Radon
    - Manmade
      - X-rays
      - Uranium mining
      - Weapons
      - Nuclear power plants
      - Nuclear satellites/space debris
  - Non-ionizing
    - Radio frequencies
    - Microwaves
    - EMT (power lines, electrical circuits)
    - Video display terminals (VT)

- ***Substance Categories***

- Besides some of the basic categories included in the list of forms (e.g., biological agents, explosives, radiologicals), there are several broad categories of substances of particular concern, including classifications by chemical group, uses, properties of substances, point of application, destination in the environment, target, kind of effects, etc.:

- ***Chemical Groups***

- Acids
- Metals (heavy and not)
  - carcinogenic (arsenic, cadmium, zinc, chromium, etc)
  - Neurotoxic (lead, mercury)
- Hydrocarbons
- Halogens and halogenated hydrocarbons
  - Chlorine
  - Fluorine
- Halogenated hydrocarbons (or “organochlorines” are a particular problem because they are generally very toxic, can accumulate in body tissue and may last a long time (i.e., “persist”) in the environment
  - About 11,000 organochlorines have been identified
    - About 50 of them are pesticides, including some of the best-known problem pesticides like DDT, toxaphene and Agent Orange, many of which have been banned or severely restricted
    - Other well-known problem organochlorines include solvents like the dry-cleaning fluids perchlorethylene (“perc”) and carbon tetrachloride, and PCBs (i.e., Poly-Chlorinated Biphenyls)
- Ethers, Cyanides, Esters, etc
- Phenols

- ***Application/Release method***

- Aerosols (bug bombs)
- Pastes/salves
- Tablets, capsules, injections, suppositories, compresses
- Vent/Exhaust (e.g., exhaust gases)

- ***Uses*** : one major way of identifying substances is through their use:

- ***Pesticides*** (Penta, 2,4-D, DDT)
  - Includes Insecticides, Herbicides, Fungicides, etc
- ***Solvents***
  - Hydrocarbons: alcohol, benzene, formaldehyde, toluene, xylene, MEK, etc.

- Chlorinated hydrocarbons: chloroform, carbon tetrachloride, methylene chloride, TCA, TCE, PCE, etc.
- *Coatings, paints, epoxies, dyes, adhesives*
- *Cosmetics*
- *Pharmaceuticals, Medicines*
- One very large *use category* is the category of non-use, or *wastes*
  - Can mean *any substance disposed of*, including air emissions, discharges to water/wastewater, etc.; but usually we mean legally defined wastes
  - In the US, wastes are legally divided into **solid** and **liquid** wastes; many wastes of both kinds are “hazardous” in the common sense, but the term “**hazardous waste**” is usually used in its legal sense as a sub-category of **solid waste**. It is also a subcategory of **hazardous materials**
  - As defined in the US law RCRA (which stands for the Resource Conservation and Recovery Act), the term **solid waste** includes **liquid solid waste, medical waste, municipal solid waste, industrial waste, radioactive waste**, etc., as well as **hazardous waste** and its various **sub-categories** (e.g., **household hazardous waste**)
  - But it excludes “non-solid liquid wastes” like **wastewater, septage**, etc., which are regulated under another law, the Clean Water Act (CWA)
  - Under RCRA and the other US federal hazardous waste law known as Superfund (CERCLA, the Comprehensive Environmental Response, Compensation and Liability Act), substances are designated as hazardous waste in one of two ways: either because they are **listed** in one of the two statutes, or because they have certain *statutorily defined* properties or **characteristics** set down in RCRA: **ignitability, corrosivity, reactivity, radioactivity, toxicity**
  - Mexico has similar lists and criteria under technical norms and *reglamentos* pursuant to the *Ley General del Equilibrio Ecológico y Protección al Ambiente* (LGEEPA) but the two countries' definitions are not the same in all cases. This is an example of the issue of **harmonization**
- **Properties** (DOT/UN Transportation/emergency planning & response/wastes)
  - Class 1 - Explosives

- Div. 1.1 Explosives with a mass explosion hazard
- Div. 1.2 Explosives with a projection hazard
- Div. 1.3 Explosives with predominately a fire hazard
- Div. 1.4 Explosives with no significant blast hazard
- Div. 1.5 Very insensitive explosives; blasting agents
- Div. 1.6. Extremely insensitive detonating articles

- Class 2 - Gases

- Div. 2.1 Flammable Gases
- Div. 2.2 Non-flammable, non-toxic compressed gases
- Div. 2.3. Gases toxic by inhalation
- Div. 2.4. Corrosive gases (Canada)

- Class 3 - Flammable Liquids (and Combustible liquids)

- Class 4 - Flammable Solids: Spontaneously combustible materials and Dangerous when wet Materials

- Div. 4.1 Flammable solids
- Div. 4.2 Spontaneously combustible materials
- Div. 4.3 Dangerous when wet materials

- Class 5 - Oxidizers

- Div. 5.1 Oxidizers
- Div. 5.2 Organic peroxides

- Class 6 - Toxic materials and infectious substances

- Div. 6.1 Toxic materials
- Div. 6.2 Infectious substances

- Class 7 - Radioactive materials

- Class 8 - Corrosive Materials

- Class 9 - Miscellaneous dangerous goods

- Div. 9.1 Miscellaneous dangerous goods (Canada)
- Div. 9.2 Environmentally hazardous substances (Canada)
- Div. 9.3 Dangerous wastes (Canada)

- ***Fate and Effect*** (*properties* are a kind of *effect*): human and non-human

- ***Emergency/”Incidental” Effects***

Typically one-time exposure to single or multiple substances; may be large or small dosage, may be acute or chronic effects

- ***Routine/Continual Effects***

Cf. land-use planning issues: typically multiple exposures to

multiple substances; may be acute or chronic effects, but likely to be aggregative or cumulative effects

- ***Environmental Fate/Ecological Effects***

- ***Venues***

- Air Pollutant, Air Toxic
    - Water Pollutant, Groundwater Contaminant
    - Pesticides (Herbicides, Insecticides, Defoliants, etc)
    - Soil Sterilants
    - Food Residues/Adulterants

- ***Persistence*** (some substances are extremely long-lived in the environment:

- e.g., scientists have estimated that chloroform will persist in water for as much as 1850 years)
    - Some radioactive wastes, of course, will remain deadly for 20-100,000 years
    - An interesting thought when we consider that the United States has been in existence only a little over 200 years, and western civilization has only been around for 5-7000

- ***Bioaccumulativity*** is a property related to persistence; bioaccumulative substances accumulate and persist in body tissue

### III. Health Effects

- **Systemic/Non-systemic**

- **Mechanical effects:**

- Macro-effects: irritants, abrasives, corrosives, etc.
  - Organ effects Bioaccumulativity (e.g., liver/kidney)
  - Molecular effects

- cancer, immune system, etc

- Mimickers

- e.g., estrogens, estrogenics, xeno-estrogens, etc.

- e.g., free radicals promoted by oxidants in blood, including those released by hormones; they damage DNA (proteins); anti-oxidants (Vitamin C, Vitamin E etc) may combat cancer by this *mechanism*

- **Toxicity** (human and non-human)

- Acute

- Chronic/Sub-chronic/Delayed

- Immunotoxicological

- Neurotoxicological (Behavior)

- Reproductive

- Estrogenics

- Genetic

- Mutagens, Teratogens, Carcinogens

- Cancer

- According to National Cancer Institute, about one in three people in the US will have cancer, and one in four of us will die of it

- Although rates of lung cancer (thanks to reductions in air pollution and the campaign against cigarette-smoking) are going down, rates of many other cancers are going up, particularly those kinds known to be associated with exposure to toxic substances, including:

- Childhood leukemia

- Brain cancer (nervous system)

- Liver cancer

- Kidney cancer

- Testicular Cancer

- Birth Defects

- **Exposure**

Unlike *properties* (which define the intrinsic *hazards* of a substance), *effects* require *exposure*; the difference between a *hazard* and a *risk* is that ***risk depends on some measure of exposure***

- ***Routes of Exposure***: besides the environmental media (air, water, soil, etc.), routes of exposure can be described in terms of pathways into the body:

- Inhalation (IHL)

- Ingestion (Oral/ORL)

- Absorption/injection (Dermal/ABS)

- ***Duration/Periodicity of Exposure*** e.g., Peak Vulnerability (of subject/of release)

- ***Amount/Intensity/Rate of Exposure (Dose)***

- ***Site/Endpoint of Exposure***

- *Principal target* organs: especially fatty tissues and elimination system,

e.g.:

- Respiratory System (> 100 toxicants)
- Skin
- Liver (> 100 toxicants: solvents, metals, etc.)
- Reproductive organs (sterility, birth defects)
- Brain, nervous system
- Heart and blood (leukemia, multiple myeloma)
- Kidneys (metals)

• ***Data Gaps and other Uncertainties***

• Effects Data Sources

- Epidemiology - Human Data
- Toxicology - Animal Data
- Other factors (e.g., TCLP: leachability coefficient)

• **How much? (Dose)**

• Quantities usually expressed in volume or weight (of product or active ingredient) but may also be in concentrations or rates (or release, absorption, percolation, etc.)

• Dioxin: 5ppm causes birth defects in rhesus monkeys

• Pathways research has shown that our old notions of dose-response relationships are far too simplistic. E.g., a substance may not exactly "cause" cancer, but may "promote" tumors through a number of intermediate steps--so that the cancer may not start in the organ that was exposed but in a site of the body several steps removed from the exposure site.

• Research has also shown that the old adage "Dose determines the effect" is not always true either; in fact, in some situations with some toxics, a smaller dose may result in greater effect than a larger dose.

• In general, what we are learning from better science is that the effects of toxics on organisms and ecosystems is in many cases far subtler than our earlier assumptions would have had us believe.

• Instead of talking about "causing cancer," for instance, medical science is now more likely to talk of substances being "associated with" cancer—which is often about as close as we can come to determining actual causality.

• Given the great many data gaps and other uncertainties, and our increasing knowledge about low-dose and other subtle effects, it makes sense to consider *exposure*

*as equivalent to effect*

- **Standards**

Typically standards do not address different metabolisms/"biochemical individuality" or special sub-populations (e.g. elderly, pregnant women and children: who are not just "little adults" biologically, but have specific metabolic conditions)

- TSCA requires health, safety and environmental testing on all substances manufactured in the US, but the required full health and ecological testing has been done on less than 3% of these; most have had no testing at all

cf. William Reilly, who said in 1987 (shortly before he became head of the US-EPA: "The science of risk assessment is relatively undeveloped. The National research Council concluded in a 1984 report that fewer than 2 percent of the chemicals currently used for commercial purposes have been tested sufficiently for a complete health hazard assessment to be made. Adequate information to support even a partial hazard assessment is available for only 14 percent of the chemicals; for 70 percent, no information is available. Moreover, those percentages refer only to human health hazards. In general, environmental hazards are even less well understood."

- Most substances put on the market without full testing: "innocent until proved guilty"

- Most existing data is on cancer, but huge data gaps exist even in that area. In recent years, studies have shown the need for a great deal more data in areas like:

- low-dose effects
- effects of mixtures (potentiation, synergy)
- pathways/mechanisms of toxicity (indirect effects)
- transgenerational effects
- non-cancer effects
- non-human effects

• Cf low-dose, multi-source, multi-exposure:  
*cf Gulf War Syndrome*

- **How clean is clean?**

- Whether we're talking about siting a new facility, setting emissions limits on an existing one, cleaning up a hazardous waste dump, or some other toxics situation, a basic question is "How clean is clean? This is a question about standards

• It's a question that involves the basic questions of "acceptable risk" and the Principle of Prudence discussed above and basic management policy questions about the value of after-the-fact control measures, *Assimilative Capacity vs. Pollution Prevention* and the *Precautionary Principle*:

- How much can I get away with? vs. How much can I prevent?
  - How much before I cause harm? vs. How much is good for us?
- It also involves the technical question of where and when standards are applied: clearly, the most effective way to deal with the hazards is not to produce or use the hazardous substances at all
- Areas of standards application
    - Biometry standards
      - Testing/sampling protocols
        - Lab (vs. “lab fraud”)
        - Field
      - Site of application of standards
        - Facility Siting
        - Facility Design
        - Facility Operations
      - Environmental standards (i.e., emissions/discharge “limits”)
      - Health standards (i.e, exposure limits/tolerances)
      - Disclosure standards
        - Nomenclatural consistency/compatibility/harmonization
        - Labeling (cf. FDA, DOT/UN placarding)
        - Reporting
    - ***Basis for Standards***
      - Health-based (cf OSHA, CWA, FFDCA, pre-1990 CAA)
      - Risk-based (cf 1990 CAAA, 1996 FQPA)
      - Performance-based (= Assimilative capacity: AAQS, NESHAPS, SWQS, etc)
      - Technology-based (BAT/BACT/BADCT/MACT/RACT, XL, ISO 14000 (in descending order of stringency/protection))
    - ***Methodology***: Ambient standards extrapolated from
      - 1) high-dose laboratory animal and workplace exposures to low-dose “average” lifetime exposures
      - 2) single-substance lab studies to real-life multiple exposure to multiple substances with cumulative effects
      - 3) Epidemiological studies - usually on the most easily studied populations—workers (convention: healthy, white, 70kg males: cf. “healthy worker bias”)
    - ***Dose/Response conventions***

LD-50: Lethal Dose 50%  
LC-50: Lethal Concentration 50%

NOEL - No Observed Effect Level  
NOAEL - No Observed Adverse Effect Level

Q\* = Q-Star (Cancer potency factor)

RfD - Reference Dose (for non-cancer effects)  
Risk assessment range/number (e.g. 10 E-6)

IDLH = Immediately Dangerous to Life and Health (NIOSH/MSHA)

• ***Environmental media standards/limits***

• ***Air in the Workplace*** (OSHA): usually expressed in concentrations (mg/m<sup>3</sup>)

TWA = Time-Weighted Average

REL = Recommended Exposure Limits (NIOSH): > 10 hr workday/40-hr workweek based on TWA

STEL = Short-time Exposure Limit (NIOSH): > 15-min TWA value for any one workday

PEL = Permissible Exposure Limits (OSHA): various durations for peak exposure during work periods (e.g., 5 minutes in any 2-hour period)

TLV = Threshold Limit Value (ACGIH: American Conference of Governmental Industrial Hygienists)

• ***Ambient Air*** (Clean Air Act: EPA)

***NAAQS*** ( National Ambient Air Quality Standards)

5 only: Criteria pollutants: NO<sub>x</sub>, SO<sub>x</sub>, Ozone, Lead, Particulates (PM-10)  
Health-based/risk-based

***Air Toxics*** (HAPS):

NESHAPS (National Emissions Standards for Hazardous Air Pollutants):  
8 only: Vinyl Chloride, Benzene...  
Health-based

MACT, RACT, etc under CAAA 1990 (cf. BACT, pre-1990)  
technology-based (industry-by-industry, process-by-process)

AZ: HBGL (Health-Based GuideLines) = non-enforceable ADHS/ADEQ benchmarks for permits

### ***Drinking Water***

*Safe Drinking Water Act* (SDWA)

National standards for “conventional pollutants” and 126 “Priority (toxic) Contaminants”

Any groundwater can have drinking water standards applied if it is designated a “Sole Source Aquifer” (cf. Upper San Pedro basin)

MCLG (Maximum Contaminant Level Goals)  
Health-based

MCL (Maximum Contaminant Level)  
Health + economics

### ***Surface Water***

*Clean Water Act* (CWA): surface water only

NPDES (National Pollutant Discharge Elimination System)  
facility-by-facility discharge limits based on national “Surface Water Quality Criteria” (results in MCL + economics + site-specific factors)

Health-based plus economics (BAT)

### ***Ground Water***

*Arizona ARS Title 49* (Aquifer Protection program)  
groundwater based on MCL plus some prevention (e.g., new facilities prohibited from discharging “killer toxins”), and options for site-specific standards stricter than MCL (e.g., “background level”)

## **IV. Hazard Identification, Part II: From Where, To Where**

### **• From where? (source part 1: industrial classification):**

• Hazardous waste and other hazardous materials come from all sectors of society and all industrial classifications, including (based on US Standard Industrial Codes):

- Agriculture (SIC 01-08) [pesticides, fertilizers]
- Mining (SIC 10-14) [heavy metals, chemicals, explosives]
- Construction (SIC 15-17) [chemicals, explosives, metals]
- Manufacturing (SIC 20-39) [all types]
- Transportation (SIC 40-47) [chemicals, explosives, metals]

- Communication (SIC 48) [chemicals, metals]
- Public Utilities (SIC 49) [chemicals, radiologicals, biologicals, explosives, pesticides]
- Wholesale Trade
- Durable Goods (SIC 50) [chemicals, metals]
- Nondurable Goods (SIC 51) [chemicals, explosives, metals, biologicals]
- Retail trade (SIC 52-59) [chemicals, metals, explosives, biologicals]
- Services (SIC 72-78, 80) [chemicals, biologicals, metals]
- Private Households (SIC 88) [chemicals, biologicals, metals]
- National Security (i.e., armed services, police) (SIC 97) [chemicals, weapons, explosives, biologicals, metals, pesticides, radiologicals]

• We can also look at particular industries under these general classifications and list the kinds of materials they typically use or waste; e.g.,:

- Electronics industry typically has solvents, metals, plastics. . .
- Metalworking typically has metals, acids, etc.

• **from where (source part 2: lifecycle):** But to understand sources of hazardous materials we need to be more specific than sectors and look at specific sites and, even more specifically, at every step or **process** in the **lifecycle of products**:

• **Production processes:**

- Mining is probably the worst example of wasteful production processes:
  - E.g., an ore body with 0.3% copper (not unusual in the US, where the richest ore bodies have been mined out) will yield about 6# copper for 1994# wastes/ton
  - Contemporary gold mining is even worse: e.g., a gold mine being proposed by Phelps Dodge in Montana would dig a hole with a volume of 65 million cubic yards to produce only 10.4 cubic yards of gold
  - Other production processes are not generally as wasteful as mining, but often generate a great deal of waste in comparison to amount of raw materials generated

• **Refining/processing**

- E.g., smelting of an ore after it is mined generates large quantities of waste in the form of slag piles and air emissions
- Many processes generate additional wastes from so-called **process chemicals** used to facilitate production,
  - e.g., solvents that evaporate or are discharged into wastewater or

other wastestreams

- **Transport** of raw material to location where it will be used in product manufacture may result in many losses into environment may occur en route: e.g., dust from speeding trucks, leaks and spills from tank cars, etc.

- **Product manufacture**, like raw material processing, again generates wastes in the form of off-gases, wastewater discharges, etc., as well as releasing hazardous materials incorporated in the products themselves (e.g., CFCs in aerosols, refrigerators and air conditioners, mercury and lead in batteries, etc.)

- Products in commerce are in general the largest uncontrolled source of hazardous materials release to the environment and probably the largest source of direct exposure to people

- There is little regulation of finished products except so-called "free market controls," except, in some cases, through labeling or Product Safety requirements and , in some cases (e.g., pesticides) through use and handling regulations

- Assembly operations, like those in many of the maquilas, because they use few hazardous materials either as raw materials or as process chemicals, tend to be among the smaller industrial generators --though many small plants in the same geographic area can be responsible for a high aggregate amount of wastes

- **Waste Treatment:** usually a recovery process (e.g., recycling) or waste minimization process (e.g., incineration); in any case, generates or leaves waste products (e.g., solvent recycling leaves sludges that are stripped out, incineration emits metals, PCBs, etc. and leaves hazardous incinerator ash)

- After transport of the finished product (which has some of the same risks of spills, etc. as raw material transport), **the product itself eventually wears out**, if we're lucky ends up in dump, but in any case gets disposed of where its hazardous components are released to the environment

- **Disposal:** And even if it does get sent to a dump, all dumps (liners) leak and many of them burn, sending toxic substances into the air

- **from where part 3: facilities, transportation** (fixed/mobile)

- **To where? ( Fate):** the air, the soil, the water, food, wild animals, our homes, our workplaces, public places, the polar ice caps, our blood, our chromosomes. . . .

- **Receptors**

1. Earth (soils)
2. Air (atmosphere, stratosphere)
3. Water

- a. Surface Water
- b. Groundwater
- c. Drinking Water

- Biological Receptors
  - Natural Systems (Physico-social)
    - Plant Communities (Formations, Ecosystems, etc)
    - Animal Communities
      - Animals: habitats, biomes
      - Humans: subpopulations, neighborhoods, etc.
  - Individual plant and animal species
  - Individual humans

## V. Management Framework

• **Principles:** Both countries talk about waste similarly. base regulation on 2 Principles, one technical, the other socio-political:

- Technical: Assimilative Capacity = "Dilution is the solution to pollution"
- Socio-political: Innocent until proved guilty
  - = Industry "right to pollute"
  - = Body count theory of public health regulation;

### • Regulatory Scheme

#### • Regulatory Sectors

- Public
  - a. Individuals, families
  - b. Non-governmental organizations (NGOs)
  - c. Media
- Private
  - a. Management
    - (1) Private businesses
    - (2) Corporations
    - (3) Trade organizations
    - (4) Cartels
  - b. Labor
    - (1) Unions
- Government
  - a. Legislative (law, statute, ordinance)
  - b. Executive (administration, regulation)
    - (1) Office of President
    - (2) Agencies (EPA, OSHA, FDA)
  - c. Judicial

#### • Regulatory Levels and Tools

- Jurisdictions
  - Local: ordinances
  - State: laws, regulations
  - Regional: interstate compacts (cf Calif radwaste)
  - Federal: laws, regulations

- International (non-binding, no teeth)
  - Treaties (e.g., La Paz Agreement Annex III: wastes/JRT, International Boundary Water Treaty)
  - Conventions
    - Migratory Bird Treaty
    - Basel Convention on traffic in hazardous wastes
    - Montreal Protocol on protection of ozone layer
    - Trade agreements like GATT/NAFTA
    - Codes of Conduct
      - FAO Code on Traffic in Hazardous Substances
      - Agenda 21

- ***Instruments***

- License, certification: local, state, federal levels
- Permits: local, state, federal levels
- Financial incentives/disincentives
  - a. Taxes
  - b. Fees
  - c. Trade preferences (international)
- Penalties
  - a. Civil (fines, restrictions)
  - b. Criminal (fines, restrictions, incarceration)
  - c. Trade sanctions (international: e.g., NAFTA/NACEC)

- **Regulatory Points of Compliance**

- Substance/Product/Organism
  - Pesticides (FIFRA, HMTA)
  - Radiologicals (AEA, HMTA, UMTRCA)
  - Hazardous Wastes (RCRA, CERCLA)
  - Toxics (TSCA)
  - Food (FFDCA)
  - Species (ESA, MBTA)
  - Products (CPSC)
- Media
  - Receptors
    - Air (CAA/ Montreal Protocol)
    - Water
      - Surface Water (CWA: NPDES)
      - Groundwater (CERCLA, RCRA, AZ-EQA)
      - Drinking Water (SDWA)
  - Biological Receptors
    - Natural Systems (Wilderness Act, National Park acts)
    - Species (ESA)
- Facility/Site/Location
  - Mines (MSHA)
  - Hazardous Waste Facilities (RCRA)
  - Hazardous Waste dumps (CERCLA)

## General (EPCRA, CAA, CWA)

### • **Management Components**

- Characterization
  - a. Site
  - b. Facility
  - c. Substances
    - (1) Raw
    - (2) Processed
    - (3) Wastes
  - d. Processes
    - (1) Storage
    - (2) Production
    - (3) Transport
    - (4) Treatment
    - (5) Disposal
- Monitoring of all receptors
- Emergency Plan
  - a. Safety Audits
  - b. Hazard Analyses
  - c. Equipment/Personnel
  - d. Exercises
- Corrective Action Plan
  - a. Alert levels
  - b. Trigger levels
  - c. Remediation Procedures
  - d. Clean-up standards
- Closure/post-closure Plan
- Financial Assurance
  - a. Corrective Action/Remediation
  - b. Closure/Post-closure
  - c. Medical/Social Impacts
- Public participation
- Public disclosure (see Right to Know)
- Enforcement and compliance
  - a. Investigatory capability
  - b. Penalties
  - c. Citizen Suit

### • **Control vs. Prevention**

- **End of Pipe/Release** (after-the-fact)
  - Production/generation
    - Control technology (BAT/BACT/BADCT/etc.) for emissions, discharges, etc. under CWA/CAA/etc
    - Waste management (minimization, etc.)
  - In-process
    - Off-gases, wastewater discharges, solid waste filings, etc.
  - Treatment/Pretreatment
    - Wastewater Pretreatment (e.g., Nogales WWTP)

- Transportation
- Disposal/Dispersal
  - Routine and "emergency incident" (spills, etc): cf Bhopal, Chernobyl, etc.
  - Landfill most common (Solidification, monofills, etc.)
    - Cf. restrictions
    - "All liners leak"
  - "Land treatment"
  - Discharge to wastewater (CWA/CNA)
  - Incorporation in products
- **Front of Pipe** (Pollution Prevention, Pre-generation: P2, TUR)
  - cf RCRA Treatment "management hierarchy"
    - **Source reduction**
    - Treatment/Waste Management
      - Re-use
      - Recovery, recycling
      - Incineration and other "thermal reductions")
    - Disposal
  - Only the first of these, **source reduction**, is really **pollution prevention**: the others are end-of-pipe
- Pollution Prevention is based on the **Precautionary Principle**
  - Has been expounded in several countries and by several organizations; in North America. best official statement is from the **International Joint Commission (IJC)**, which says: once we manufacture certain kinds of substances (i.e., bioaccumulative, persistent toxics like mercury, PCB), we cannot keep them out of the environment; so even if we don't know the full extent of their harm, we know enough to ban them -- i.e., Front of Pipe control
- Precautionary Principle is equivalent to the Prudence Principle of Public Health and is directly contrary to the Assimilative Capacity model and the Right to Pollute concept that is the basis of risk assessment
- Neither the US or Mexico has adopted a Precautionary Principle law or policy
  - Instead, both require that harm be proved before chemicals are banned (cf. DDT, 2,4,5-T, DES, etc.)
  - The US law closest to a Precautionary Principle law is the Toxic Substances Control Act (TSCA) which in theory requires manufacturers of substances to prove their safety before putting them on the market; but TSCA has never been enforced
  - In addition, in 1990 the US amended its Clean Air Act to

requires (§112r) require some accident prevention measures

- Process Safety Management (PSM) requirements for workers under OSHA
- Accident Prevention Procedures (ARP) for environmental protection under EPA
- Some states in the US: have adopted Pollution Prevention laws (e.g., Calif, Arizona [though Arizona's legislature gutted that law during the 1994 session])
- The US Pollution Prevention Act of 1994 does not require pollution prevention from companies, but only that they disclose what, if anything, they are doing in the way of pollution prevention

## **VI. Information Sources**

### **A. Labels & Labeling**

- MSDS
- Product labels
  - Pesticides
  - CPSC
- Placards (vehicles, drums, work areas)
- Shipping papers/manifests

### **B. Permits/Licenses**

- CAA
- CWA
- RCRA
- APP

### **C. Disclosure Reporting**

- SEC 740s
- NEPA
- EPCRA
  - Tier 2
  - Form R
- OSHA Safety audits
- Pesticide Use reports (1040s)
- TSCA notification

## **VII. Worker and Community Right to Know (RTK)**

- And that brings up a general rule of toxics politics: When workers and the public haven't been able to get real pollution prevention (P2) and toxics use reduction (TUR) (which for the most part, they haven't), they have traditionally gone for right to know (RTK) instead.
  - Accountability of industry/government

- what hazards industry and government are exposing us to, what the extent of the hazard is, what they are doing to mitigate problem, what are they doing to prevent the problem

- **RTK can be applied at every step in the hazardous materials lifecycle**, including disclosure of hazards as well as alternatives to the hazards (e.g., pollution prevention)

- **Hazard Disclosure:** May occur at any point in life cycle: usually as "end of the pipe" hazard analysis or release data:

- **Potential and actual** release and/or exposure (not "prove risk" or "show harm")

- Basic law in US is the Emergency Planning and Community Right-to-Know Act (EPCRA), which requires different kinds of disclosure in two sections:

- Emergency Planning information on facility stocking of some 300 **Extremely Hazardous Substances** (§§302/312)

- Release to the environment of some 629 so-called **Toxic Chemicals** Info (§313 = TRI)

- Mexican law allows for disclosure about stocking and release of a smaller list of so-called High Hazard Substances

- US laws (CAA, CWA, etc.) also in some cases require ambient monitoring and disclosure

- Both countries also provide for varying degrees of Environmental Impact Assessment of proposed projects, though this information is generally not available to the public in Mexico:

- The 1969 National Environmental Policy Act (NEPA) is the premier environmental disclosure law of the US and reconized as a model all over the world

- it requires federal agencies to disclose to the public potential impacts of "major" federal actions, as well as alternative actions and their potential impacts, including the "no action" alternative.

- In addition, NEPA requires the agencies to provide opportunity for public participation, including notification of and comment on draft decision documents

- Again, NEPA does not require an agency to follow the least hazardous alternative, but does require that the public be notified

- several states, including California (not Arizona) have state NEPAs (SEPAs) that are often more extensive than the federal law

- Mexico and some other countries also go further than NEPA by requiring private projects to produce EIAs
- Both the US and Mexico also have some provisions for facility monitoring and disclosure under worker health and safety laws (cf. OSHA, MSHA)
  - E.g., both countries require MSDSs for workers
- In addition, several US laws require product safety and health effects testing and disclosure of the results:
  - Federal Food, Drug and Cosmetic Act (FFDCA)
  - Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) for pesticides
  - Consumer Products Safety Act for general products (toys, consumer goods, etc.)
  - OSHA - Hazard Communication Standard and MSDSs

• **Prevention Disclosure**

As noted above, neither the US nor Mexico requires pollution prevention, only “pollution up to a point” and limited disclosure of that pollution

International trends, however (e.g., Agenda 21) are tending to combine RTK and pollution prevention, and we might see more of that in the future

At present, the closest we have is a 1992 amendment to EPCRA which requires facilities reporting under the TRI to report some basic information about their efforts at pollution prevention